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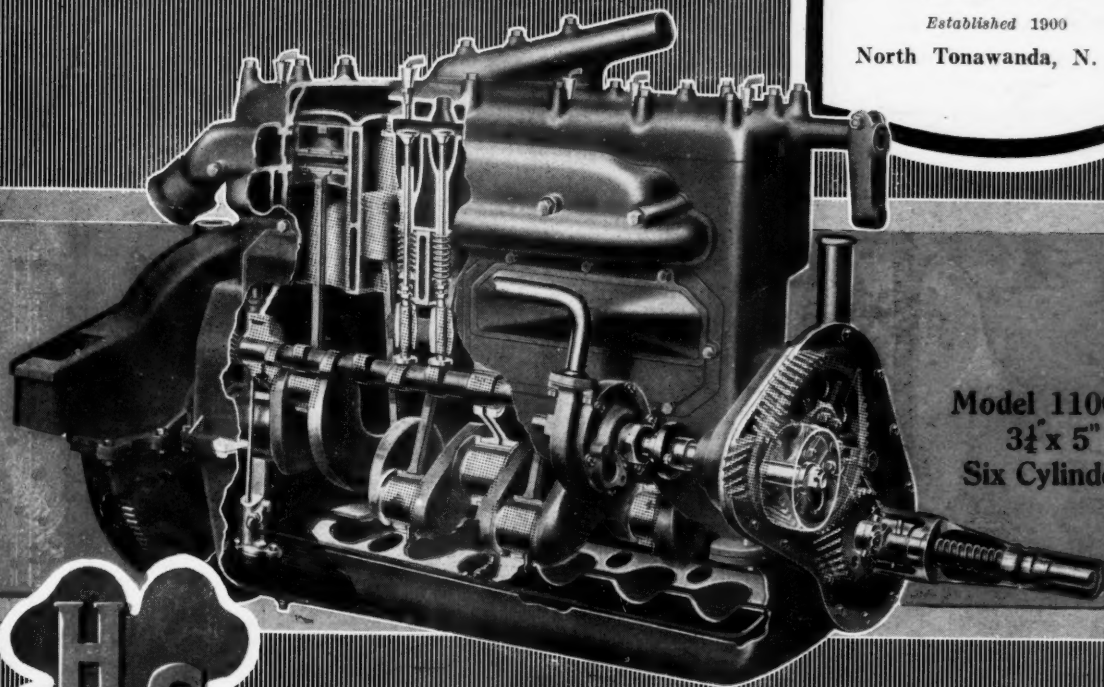
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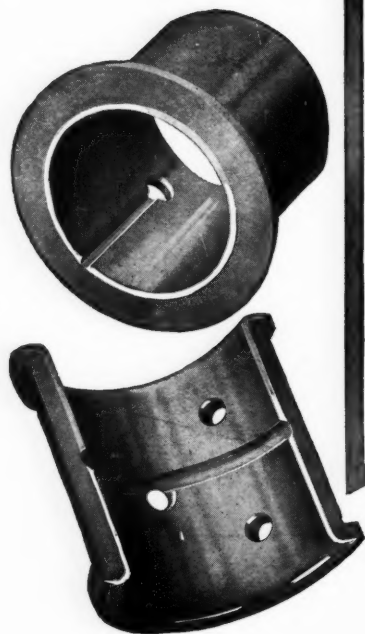
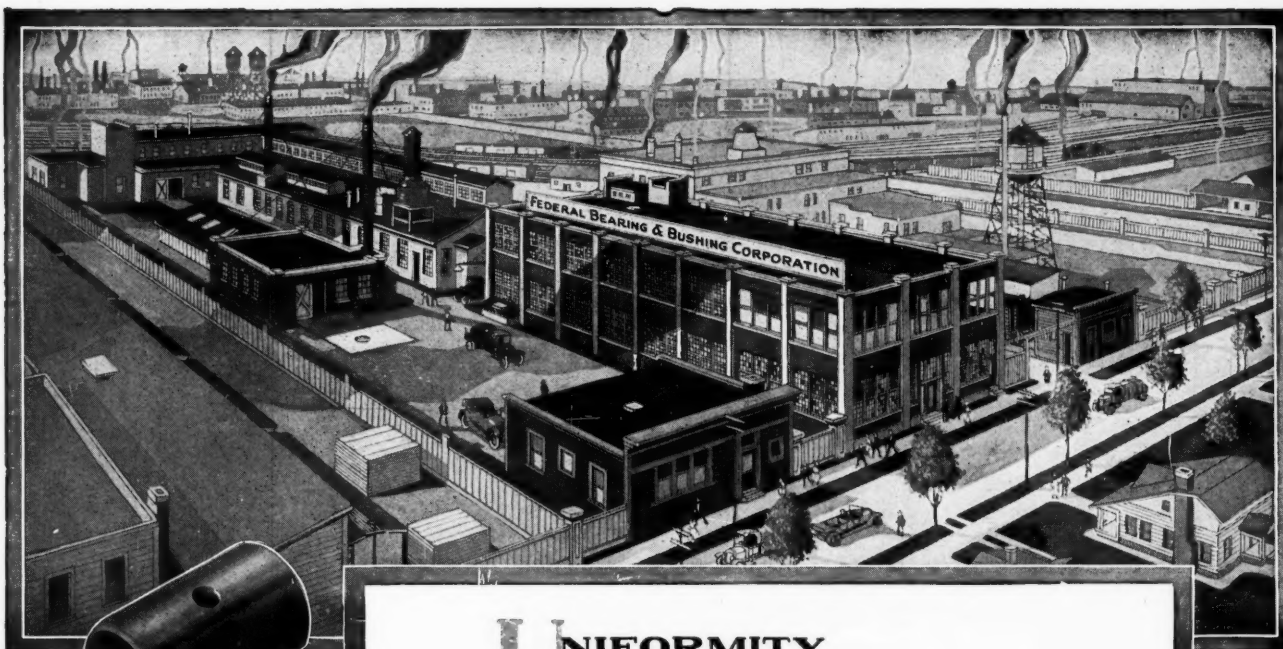
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AUTOMOTIVE INDUSTRIES

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NEW YORK—THURSDAY, SEPTEMBER 30, 1920

No. 14

Ford Did It! Now What About It?

What follows here is not given in the form of advice to automotive manufacturers. The writer does not believe that he is pointing the way, but it is merely a discussion of some obvious selling facts that may interest some persons who have goods to sell.

By Clyde Jennings

IT is not difficult these days to hear some very ugly opinions of Henry Ford. All that you have to do is to listen to some men who are engaged in the selling of automotive vehicles. Then, again, you hear the opinions from the same source that Ford's price cut the other day will not make a particle of difference to them, because the speaker is engaged in selling cars, or trucks, that cost more than \$2000. It is more than passing strange that some dealers who have cars on their floors are entirely complacent. The writer has much more respect for those who are indignant, but still more respect for those who are thoughtful.

Ford, in his cut in vehicle prices ranging from 14 to 31 per cent, has done for the automotive world what John Wanamaker did to the general merchandizing world last spring. Indeed, the comment you hear to-day inside and outside the respective lines of trade is much the same as it was then. If you will recall, there were many opinions that Wanamaker was on the verge of failure and that the cut was a last gasp. There were numerous other comments, less vicious but along the same line.

Later developments are history and do not need recalling here. It is sufficient here to note that Wanamaker did not fail and perhaps Ford may not.

It seems to the writer that these questions are much bigger ones than the mere thought of to-day or tomorrow. The public would seem to enter largely into the final consideration of the questions of price. Public opinion is a delicate thing, despite that it is so powerful. No one yet has defined exactly where it comes from or where it goes, but most of us are entirely conscious of it when it is here. Politicians, supposed experts as to public opinion, are still trying to explain why Bryan once had a clean sweep for the presidency in August and hardly registered his candidacy in November.

If the politicians could explain that movement of public opinion there would be less talk to-day about campaign funds. No man has yet had the hardihood to explain that change of public opinion by the expenditure of funds.

Public opinion is to-day squarely set in the belief it is time for war time prices to be lowered. No one will deny that. Your wife thinks so and you cannot argue her out of it.

It is very hard to find a man who does not openly assert that he is buying clothing only as he is forced to, because he expects that clothing will be cheaper.

Scratch where you will and you are confronted with the lower price idea.

We have heard it said that "with automobiles it is different." The arguments sound good. It is based on the theory that the purchase of an automobile, either the first one or a new model, becomes an obsession and that the persons wanting it become possessed of it as soon as they can meet the financial requirements, regardless of the price.

The writer wishes to present this argument fairly because he is not a follower of that school of reasoning. He is inclined to believe that people shop for motor cars as they do for pianos or anything else that takes money from the family pocketbook. The motor car trade is not quite as keenly alive to shopping as the piano trade, for instance, because ever since Ford put a price on his cars, plus freight from Detroit, the entire trade has been on a one-priced basis. The piano dealers, who make their own retail prices and sometimes give concessions, can tell many stories of shopping and price haggling.

But getting back to public opinion.

Edward S. Jordan, in his talk to dealers, uses a newspaper aphorism that is something like this:

Five per cent of the public think. Ten per cent imitate them, and the 85 per cent run wild.

This phrase is often used by a newspaper man to explain why the other paper has the largest circulation. Regardless of the origin of the phrase, or its present uses, a lot of people will say that it is about right. The fact that they put themselves in the five per cent class is neither here nor there.

But if you have studied public opinion you cannot help but think that the figures must be about right. Here is a sample from an authority that is readily at hand:

The "Annalist" food curve published in the Sept. 20 number of that magazine shows that the cost line based on "a theoretical family's food budget" was at the index figure 330 on the second week in June, and for the week before the publication had receded to 265. Any casual observer of commodity prices knows that they are lower than they were. Yet contrast these facts with these expressions of public opinion. On Sept. 23 "The Inquisitive Reporter" of a New York newspaper asked five persons the question "Are prices going down?" Here are the replies:

1. P. Donohue, accountant, 171 Fulton Avenue—I fail to see anything coming down in price except sugar and Henry Ford's cars—sugar because they hadn't room in the warehouses to hold it, and Ford's because nobody wants one of Henry's shimmy wagons if he can afford any other make.

2. E. Wendelken, musician, 314 East Tremont Avenue—With the exception of sugar and potatoes I don't notice any prices tumbling. Newspapers haven't knocked off that extra cent yet.

3. John J. Thompson, moving picture business, 320 East Fifty-eighth Street—There are a few commodi-

ties that have dropped in price in spite of the frantic endeavor to keep them up. The future promises a big tumble.

4. Charles Frates, clerk, 31 West Ninety-third Street—I haven't noticed anything being reduced where I make my purchases. In time, though, prices are bound to drop.

5. J. Trager, cloth business, 1307 Washington Avenue—If prices are coming down I have missed a bet. To my idea, they are not likely to do so for a long time to come.

The writer does not contend that, by this instance, he has proven his point, but he has illustrated it.

Let us concede, at least, that public opinion is often without the foundation of fact, that it is unreliable and variable. Then we will have to admit that it is powerful. Note the effect of the overalls clubs last spring. The idea was a "bloomer" as far as the wearing of overalls was concerned, but it had a psychological effect and was followed by the temporary closing of many woolen mills.

When public opinion is firmly set in an idea, the person it is toying with can do one of three things:

1—He can meet public opinion and take advantage of it.

2—He can put his house in order and sit down to await the changing of public opinion.

3—He can set about to educate public opinion to the facts or to his way of thinking.

1—Any one of these methods is likely to be expensive. Ford, like Wanamaker, has taken the first path. He may or may not lose by making cars at the prices he has set. His statement intimates that he will. But Ford is not poorer to-day than when he started in the business and we do not antici-

pate that he will be poorer a year from now than he is now. Perhaps he is merely buying a big advertisement on the front pages of the newspapers and by word of mouth from several million people who will discuss his latest public movement. You can judge Ford's motives as well as the other fellow. The writer's mind is not sufficiently trained to think in long rows of ciphers with a real numeral at the left-hand end of the line to reconstruct the details of his line of thought.

2—The second method is the easiest way out if you have the money. But in these times it is well to be sure of the money in advance. The Federal Reserve Board and other money powers are openly expressing against loans that mean the holding of goods for the purpose of maintaining prices. They suggest that it is better to sell at present bids, wipe off the loss and begin over on a new level.

3—The third method suggested is likely to mean a long hard battle. The only weapon at hand for the automotive manufacturer to sway public opinion is through advertisements. And, believe me, it is a long, expensive method to sway public opinion by means of type at so much per agate line.

Now what do we hear within the industry:

Some weeks ago there was a purchasing agents' con-

vention in Cleveland and it was generally reported there that raw material prices were softening and it was generally agreed that it was time to stop expensive methods of maintaining production. Material sleuths were to be called off, and there was to be less bidding against each other for materials and parts. Also there was to be a return to less expensive methods of transportation. The indication there was that peak production cost had been reached.

Next came a buying recess and some factories took advantage of their catching up with the urgent demands to let up a bit on production. Labor has well maintained its price when employed, but in a recent number of AUTOMOTIVE INDUSTRIES a number of production men were quoted to the effect that labor was giving much better returns for the money. In some cases it was said that, following the lay-off of idlers and drones, the effectiveness of labor in the plant was increased as much as 50 per cent.

Financial statements that have been forthcoming from automotive factories have not shown serious losses last year. Indeed, some of them have shown quite handsome profits. An unofficial estimate of some of the tax items given in these year-end reports would indicate that some of the factories have been in the excess profits class.

Now does all of this mean anything? Unless there is something that has not been told, it would appear to mean that production costs are lower. Perhaps they are not. No doubt selling costs are higher. The line of resistance is stronger, hence the cost would reasonably begin an upward curve. But the dealer is not getting any more out of it.

While it is difficult to get a general opinion from dealers as to the latest development, there is one opinion that every dealer appears to have fully lodged in his brain. It is something like this:

Trade slumped pretty heavily with us for some reason we cannot entirely explain. We believe that the expectation of cheaper cars had a good deal to do with it. We had prepared to slide along quietly until spring, sell what we could this fall and carry over as many as we could. We hoped that next spring, just about show season, the manufacturers would come along with sharp price reductions and we would do the biggest business in our history.

This was a nice, easy program and on paper looks fine. But Ford's mind works differently and he has dropped a hair in the dough and has entirely spoiled the liking for the biscuits. We won't even need to put the honey on the table, perhaps.

Speaking of this less buying of cars, there is an interesting point to be made here. Long terms formerly were the curse of the piano business. But about the beginning of the war there was a strong tendency for shorter terms. As merchandise became scarce, terms were shortened until it was possible to find piano merchants who would not talk anything but cash. Then when the war ended and pianos again came into a fairly liberal supply, the piano merchants eased their terms a bit. When the limit on credits came, it happened that

most piano merchants were well within the recognized short terms and still could stretch the custom a bit and not offend their bankers.

But the automobile dealers were caught the other way. Even while cars were very hard to get, they allowed sales to be made on terms that the banks will not countenance.

There is not going to be a conclusion to this article that will shed a bright, clear light on the days ahead. It is a case where every manufacturer must weigh his product and his finances against public opinion. If he has made a sufficient impression on the public through the use of his product, by his service and his advertising to make the public realize that his car and truck are worth the price he asks for them to-morrow and next year, he had nothing to fear from Henry Ford's announcement.

If he believes that his vehicle is in public mind in any other view, he had better get busy. If he cannot afford to make a cut in his present price and escape bankruptcy, he had better begin the examination into his costs. Is he paying too much overhead, too much for raw materials or production or wherein can he cut the cost of his car without cheapening the car itself?

This question can be answered only in the factory after the opinion of the men on the selling line has been heard.

It has been the history of automobile prices that they have been cut on rising production. Just now production is not generally considered to be on the up curve, although the August traffic bulletin of the N. A. C. C. would suggest that it is. But the ground work for a larger production exists

as soon as transportation difficulties are out of the way. Then the question remains, can production be spurred upward and reverse the old order of things and make a price cut responsible for a rising production?

Giving of advice is practically the same as expressing a hope. It is just a way of saying what you hope the other fellow will do. It would likely be considered impertinent for this article to advise the men who have their money and reputations at stake. But we might repeat the hope expressed by a man who has studied selling for a long time and who owes his present enviable position to that fact. This is about what he said:

I hope that every manufacturer goes into executive session with those most concerned and that he decides quickly upon his course of action. Next I hope that he acts.

If he can safely cut prices, and he believes that such a cut will stimulate sales, he should announce his determination at once.

If he cannot cut prices, or he is not going to, he should let his dealers know at once what he is going to do. He must not court bankruptcy by cutting prices below production cost.

There is no doubt of the ability of the public to buy as soon as the psychology permits. It does not matter so much what the decision is, as that it is quickly made, in order to relieve the present uncertainty and suspense.

The Six-Cylinder Edition of the Packard Car

In this long-expected vehicle, the power plant holds the center of interest. It is an L-head, with six $3\frac{3}{8}$ by $4\frac{1}{2}$ in. cylinders cast in a block. The engine structure is built of four principal components—cylinder block and cylinder head of cast iron and crankcase and oil pan of cast aluminum. The S. A. E. rating is 27.34 hp. and brake hp. reaches 52 at 2400 r.p.m.

By J. Edward Schipper

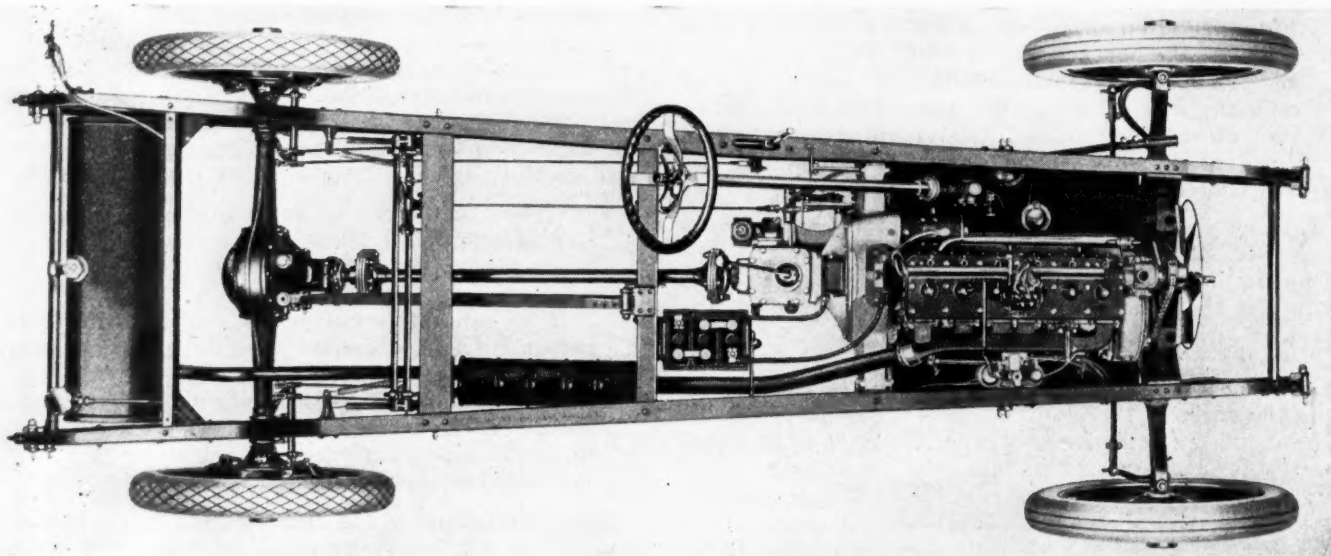
THE Packard single six, which has been expected by the trade for several months, is in production and cars are being shipped to distributors. This car supplements the twin six and does not in any sense displace it, as both models will be made in the Packard plant. In a great many senses, the new car may be termed a smaller edition of the twin six, as a great many features of practice are common to both, and the same standards of workmanship are observed in the new design as in the twin model. In other words, the car is lower priced simply because it is of smaller dimensions and the lesser amount of metal and work required to manufacture it.

The chassis of the single six weighs 2250 lb. and has a wheelbase of 116 in. The total weight of the touring car ready for the road, with gasoline, water and an extra tire, is 3080 lb. The car is offered in four body styles, these being a five-passenger touring, three-passenger roadster, five-passenger sedan and three-passenger coupe. All of these bodies are mounted on the identical chassis.

The new powerplant is of particular interest as it represents about two years of development work at the Packard factory. In fact, this design is the culmination of experiments and trials which started immediately after the war and continued up to a recent date, when the final design was decided upon. It is an L-head unit with its

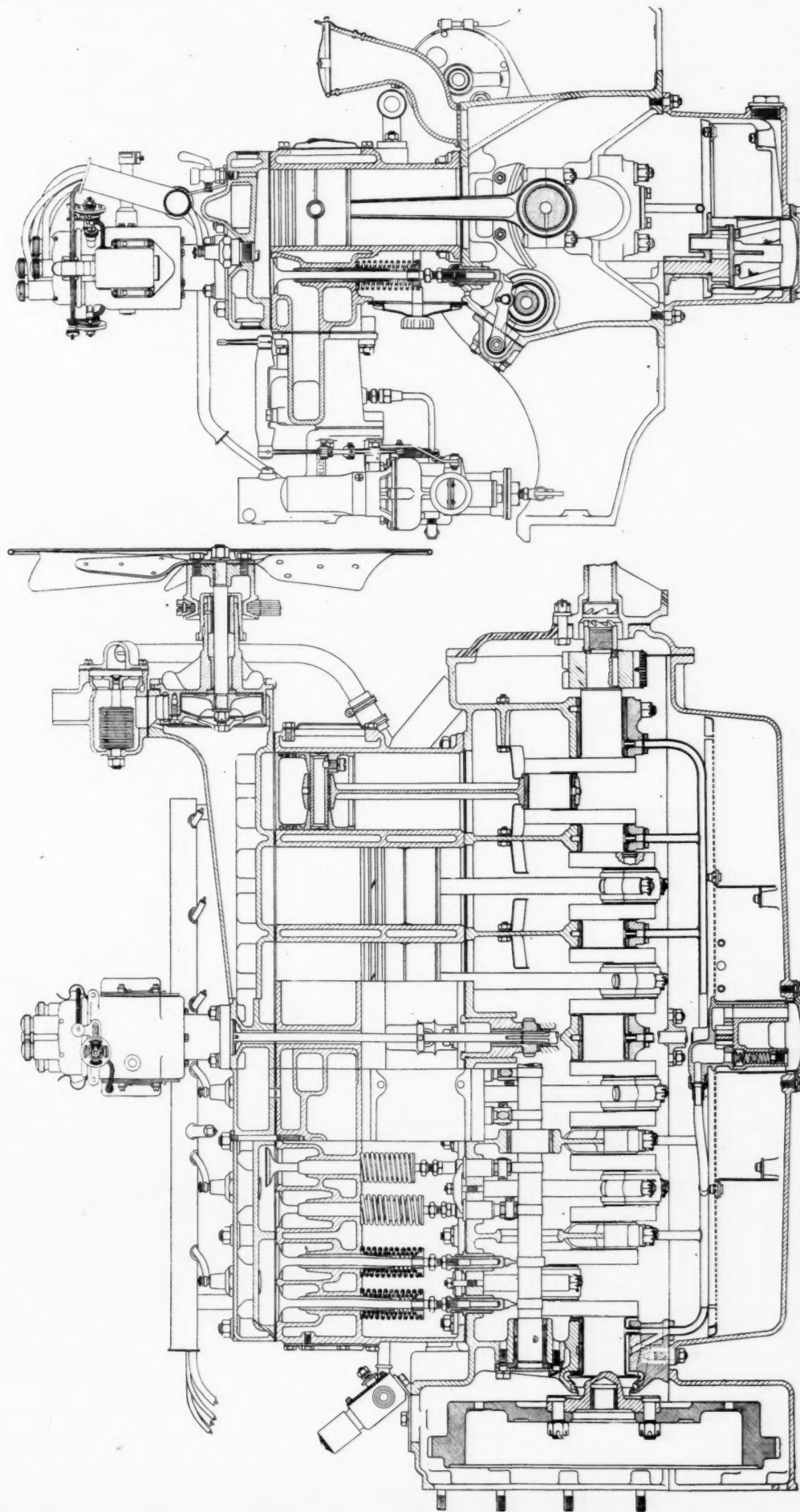
six $3\frac{3}{8}$ by $4\frac{1}{2}$ in. cylinders cast in a block. Its S. A. E. rating is 27.34 hp., and the brake horsepower, as developed on the Sprague dynamometer, averages about 39 at 1600 r.p.m. and 52 at 2400 r.p.m. which is below the peak point. The peak point on the horsepower curve is at about 2750 r.p.m. The brake mean effective pressure is around 83 lb. p.sq.in. at 800 r.p.m., and above 80 lb. from 500 to 1600 r.p.m. The compression ratio is 21 per cent. The engine structure is built up of four principal components, these being the cylinder block and cylinder head, which are both of cast iron, and the crankcase and oil pan, which are both of cast aluminum. This division of the structure into four castings permits of the simplest possible casting and hence permits of core work giving the maximum water jacketing space, and, at the same time, minimum weight.

The pistons are also cast iron, and weigh 1 lb. 7 oz. each. They are $3\frac{3}{8}$ in. in length and fitted with three rings all above the piston pin. These rings are $\frac{3}{16}$ in. wide by $\frac{7}{64}$ in. thick. The piston is, therefore, a square type with the same diameter as length. The piston pin is slightly below the center of the piston and the piston pin boss provides sufficient stiffness without additional ribbing in the piston. The piston pin is of seamless steel tubing, anchored in the boss by means of a screw through the bottom of the boss.



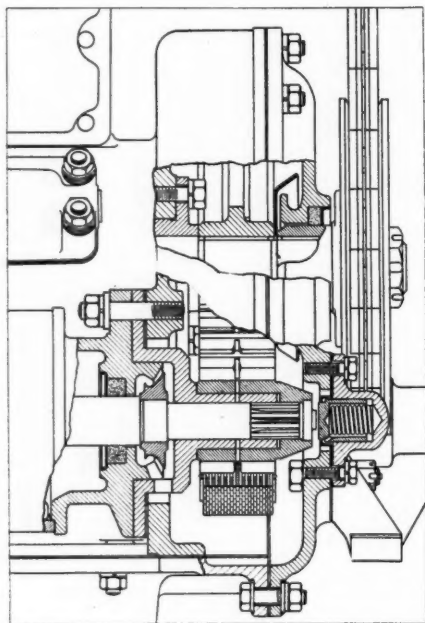
Plan view of Packard single six chassis

The New Packard Single Six Engine



Cross section

Longitudinal section



Camshaft
drive
on
Packard
engine

The connecting rod is a drop-forged I-beam section machined all over. It is $9\frac{3}{4}$ in. in length and bushed at the upper end for the piston pin bearing, this bearing being $\frac{3}{4}$ in. in diameter and $1\frac{1}{2}$ in. in length. The crankpin bearing size is $1\frac{3}{4}$ in. in diameter and $1\frac{1}{2}$ in. long. The crankshaft is a seven-bearing design, the diameter at the bearings being $1\frac{3}{4}$ in. The lengths, front to rear, are as follows: Front, $2\frac{9}{16}$ in.; center bearing, $1\frac{57}{64}$ in.; rear bearing, $2\frac{1}{2}$ in. and the four intermediate bearing lengths, $1\frac{9}{64}$ in. It is of oval cheek type ground to size.

The timing drive is by silent chain, this being a $1\frac{7}{16}$ in. chain in a triangular layout to operate the cam and generator shaft sprocket. The camshaft is a 1 in. integral unit mounted on four bearings, the lengths of which are, respectively, front to rear: $2\frac{7}{16}$ in., 1 in., 1 in., and $1\frac{3}{4}$ in. The valves are operated by a lifter finger pivoted at one end and operating the tappets at the other by a hardened and ground button against the bottom end of the hollow tappet. The lifter finger carries a roller follower upon which the cam acts to transmit the valve action. The lifter finger is pivoted on a rocker shaft mounted in the side of the crankcase in an accessible location. By removing the stud nuts from the side of the crankcase it is possible to remove the rocker shaft assemblies in groups of six. This gives a very accessible layout and it is interesting to note that the rockers are kept free from side motion and quiet by means of spring spreaders which force the rocker arms against their locating surfaces. The advantages of the finger type of lifter are in the removal of side thrust from the valve tappets, and also in helping the cam followers to follow the cam outline at higher speeds.

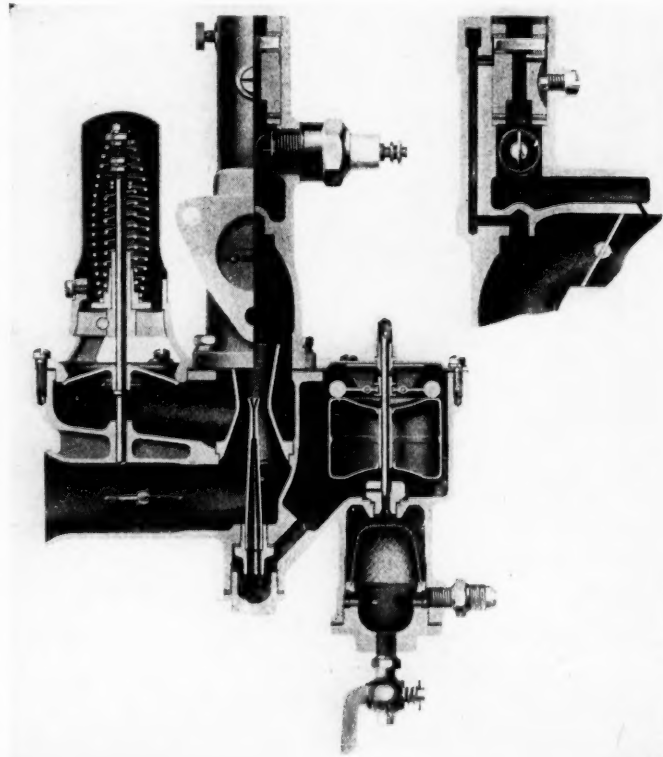
The valves are 45 deg. type, interchangeable, being $1\frac{1}{2}$ in. diameter in the clear, with a lift of $11/32$ in. The order of firing is 1-5-3-6-2-4. The valves are timed so that the inlet opens 9 deg. past upper dead center and closes 42 deg. past lower dead center. The exhaust opens at 47 deg. before lower dead center and closes 4 deg. past upper dead center. The valves are closed by double concentric springs and the valve adjustment is accessible by removing a cover plate held in position by thumb nuts.

Oiling is by full pressure feed, the oil pump being located at the center of the cast aluminum oil pan and removable from beneath by removing the nuts from the studs holding a cap in place. The oil pump and the ignition distributor are driven from a vertical shaft at the center of length of the engine, the distributor being at the upper extremity

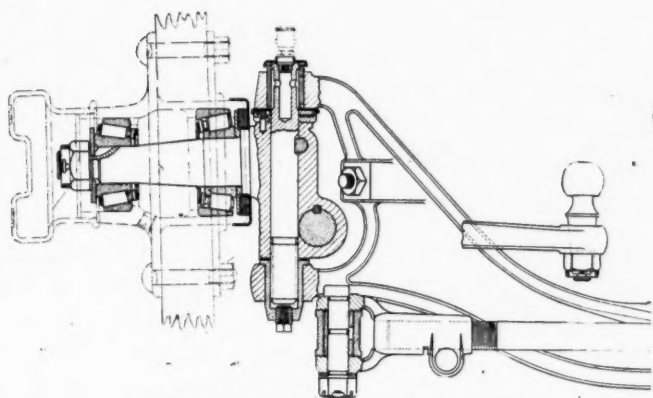
of this shaft on top of the engine, and the oil pump at the bottom extremity in the oil pan. The oil pump is a gear type delivering 25 lb. per sq. in. pressure at 1000 r.p.m. The returned oil drains through a tray screen in the oil pan and is again screened before it enters the pump. In order to prevent surging of the oil, baffle plates are placed transversely in the oil pan.

The cooling water is circulated by a centrifugal pump. The system has a capacity of 4 gal. and the temperature of the water is controlled by a thermostat which holds it to 120 to 150 deg. Fahr. The thermostat construction is an integral part of the water outlet header. It is so arranged that the water is by-passed back to the jacket and does not circulate through the radiator until it reaches the desired temperature, thus materially reducing the length of time required to warm the engine. The thermostat is a direct acting type. An unusual feature of the cooling system is that the water pump and fan are practically one assembly, being driven by a link belt off the same shaft. The water pump is placed, therefore, in the water outlet header instead of in the usual position at the side of the engine. This combines the function of the pump shaft and fan belt, giving a balanced construction and necessitating but one packing gland, which is in an accessible position behind the fan. The radiator is a hexagon type with an extra large tank at the top, which latter precludes the possibility of the water level dropping so low that the pump will not feed. In other words, considerable water has to evaporate before the pump level is reached. One of the main advantages of this location of the pump is that the generator is rendered more accessible. The location of the pump provides for a swinging adjustment of the generator to take care of slack in the silent chain drive. Incidentally, the accessibility of the water pump is also considerably increased.

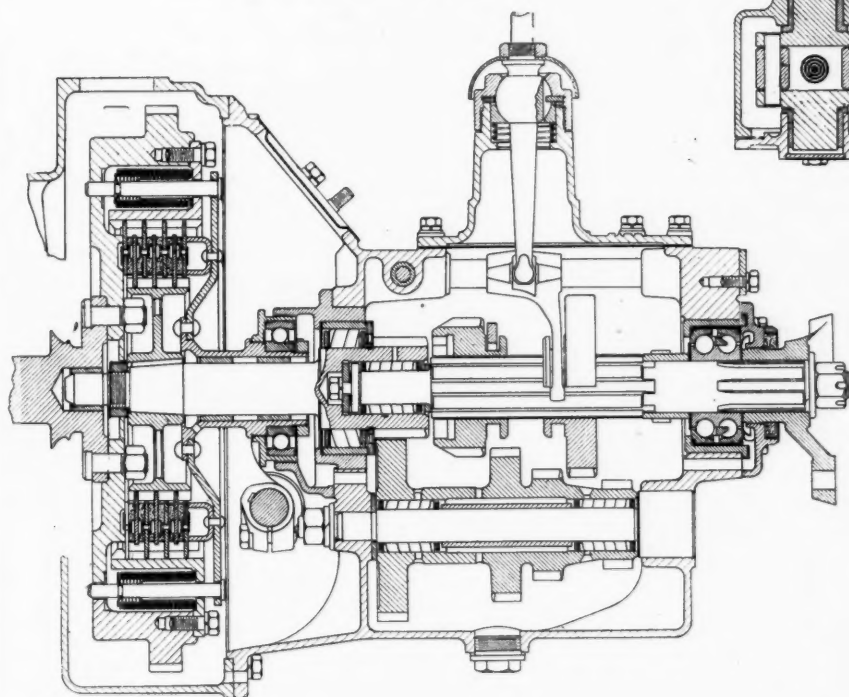
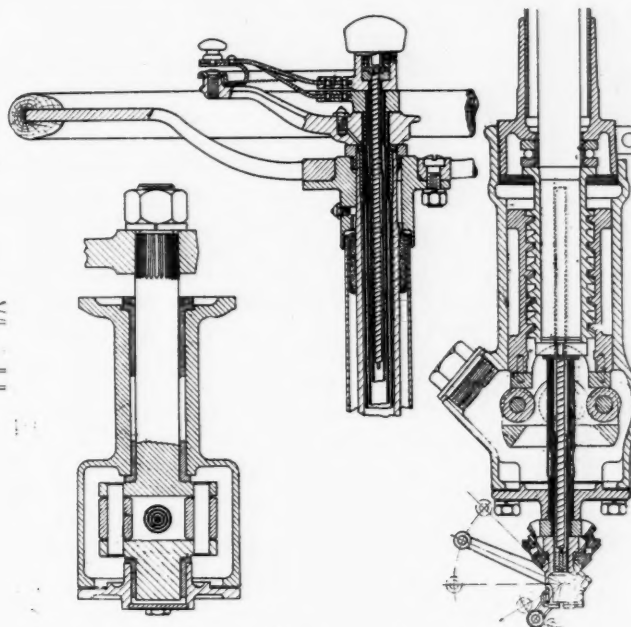
The Packard carbureter is fed from a 19 gal. tank located at the rear of the frame by means of a Stewart vacuum system. There are no unusual features to the fuel feed with the exception that the Packard fuelizer is used the same as on the twin six. This consists of a heating cham-



Sectional view of Packard carbureter with fuelizer

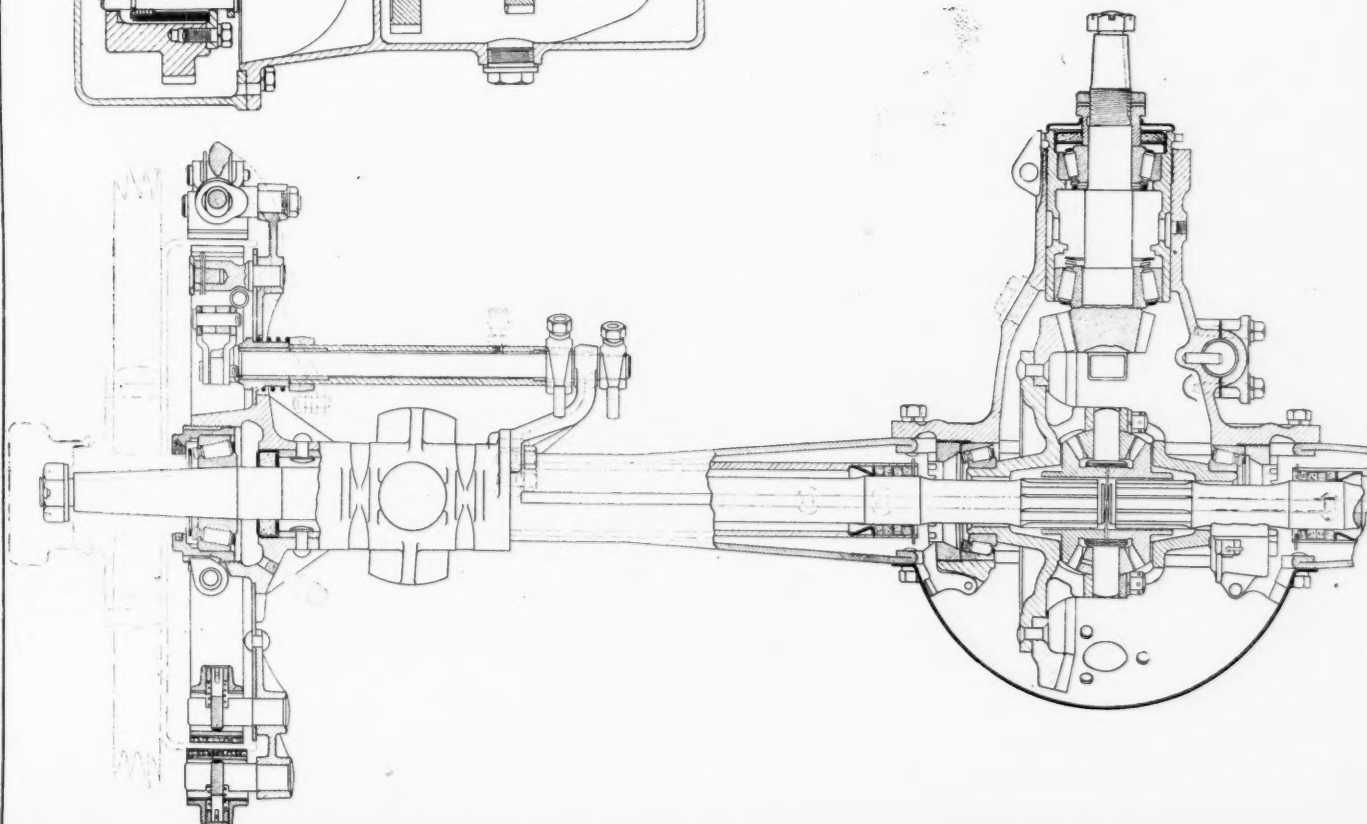


Front axle end and steering knuckle



Some Features of the New Packard Six-Cylinder Car

Above—Steering gear in three sectional views. On left—Section through clutch and transmission. Below—The pressed steel semi-floating type of rear axle



ber through which some of the combustible charge is bypassed and in which it is ignited by spark plugs, as has been described in these pages. By the use of up-to-date methods in manifolding, however, it has been possible to closely approach airplane figures in fuel economy tests. With full load at wide open throttle, the best point on the economy curve is 0.57 lb. of fuel per b.h.p.hr., which approximates results obtained in aviation practice. A little kink in manifold design, which was learned in building sixes, consists in the use of a split lead; that is, there is a partition in that branch of the intake manifold which extends down toward the carburetor, which breaks the stream into two parts for the fore and aft groups of three cylinders. It has been found by Packard engineers that loading exists in the plain T form of construction in the intake manifold of a six, due to the surging which takes place. By means of this split distribution the surge is eliminated and no loading troubles are experienced.

Before leaving the discussion of this interesting powerplant, it may be mentioned that it belongs neither to the high speed nor the low speed class. It is also of great interest to compare this with the Packard 1-38 of 1912, which had about twice the displacement of the present model, and yet it developed only the same horsepower. Of course, this engine operates at 2400 as compared with 1800 for the 1912 model, but as a result of better design a higher mean effective pressure is secured. Another way of looking at it is that for the same horsepower the weight of the engine has been cut in two.

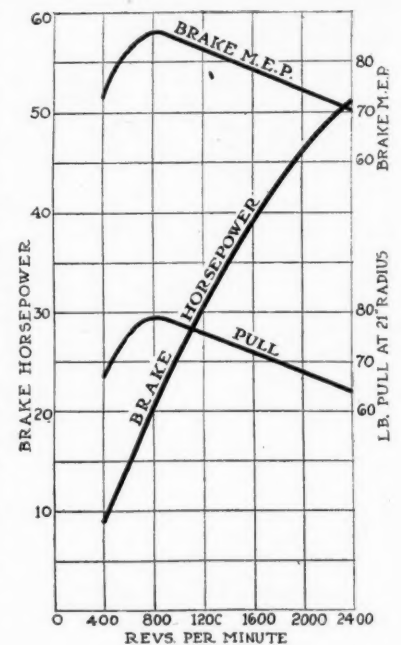
The electrical equipment consists of Delco ignition and Atwater-Kent starting and lighting, with the Bendix pinion shift. The ignition distributor, as previously explained, is driven from the same vertical shaft which drives the oil pump and is located at the top of the engine at the center of its length. The Atwater-Kent starting motor is separate from the generator, the motor being

held by S. A. E. standard type flange to the flywheel housing on the crankcase. The generator is located on the right side of the engine and is driven by the timing chain. It is secured to the crankcase by a boss on the timing gear housing at the front end of the crankcase.

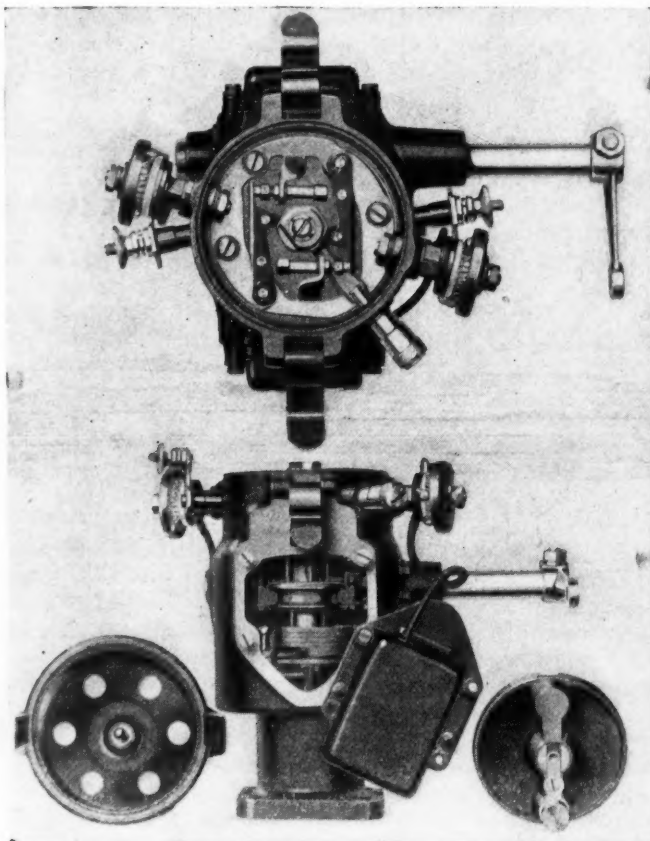
The clutch is a dry-plate type with seven plates, four driving and three driven. The clutch plate diameter is 8 in. and the clutch is housed within the flywheel in the conventional manner. The transmission gear set provides three forward speeds, the ratios in the gearbox being 3.368 to 1 on first, 1.774 to 1 on second, direct on third and 4.26 to 1 on the reverse. The clutch and gearset have been designed together to give a very smooth shift, and the rotating mass in the clutch has been cut to the minimum, the only units in motion when the clutch is disengaged being the light disks. The shifting gears have an unusually short travel and are chamfered to give very easy engagement. The gears have also unusually wide faces, giving a construction which is exceptionally sturdy and quiet. The main shaft is mounted on ball and roller bearings and the countershaft on plain bearings. The shifter mechanism is mounted in the cover plate and is removable with it. The drive is through two universal joints of the fabric disk type and a hollow propeller shaft which has a 1 3/4 in. outside diameter, and 1 39/64 in. inside diameter. The drive is taken through the springs and the torque through a torque arm. The rear axle is a semi-floating design with taper roller bearings at all points. The axle gear ratio is 4.31 to 1. The brake drums are on the rear wheels; they are 14 3/8 in. diameter and have 2 3/4 in. width of face.

Semi-elliptic springs are used, front and rear, the front being 38 by 2 in. and the rear 54 by 2 1/4 in. The wheels carry 33 by 4 1/2 in. tire equipment. The frame is a 7 in. channel, tapered type, with torsion tube construction at the front and rear. The taper construction permits of an unusually short turning radius for a car of this length, it being possible to turn the car in a circle of 16 ft. 8 in. radius. The steering is by an opposed threaded worm and split nut mechanism. The bodies and prices are as follows: Five-passenger touring car, \$3640; two-passenger roadster, \$3640; sedan, \$4950; coupe, \$4835; chassis, \$3000.

The materials used throughout the car have been particularly selected for the work and are in line with the best recognized practice. As an example, the following list for some of the vital parts may be noted: Connecting rod, 0.40 straight carbon steel; crankshaft, 0.40 straight carbon steel; transmission gears, chrome nickel; propeller shaft, 0.40 straight carbon steel; axle gears, chrome nickel; axle shaft, chrome vanadium; front axle, 0.40 straight carbon steel; frame, 0.20 straight carbon steel; axle housing, steel stamping; crankcase, aluminum alloy. Inspection of parts is very thorough.



Engine characteristics



Delco ignition unit with automatic advance

A Cold-Starting Kerosene Engine

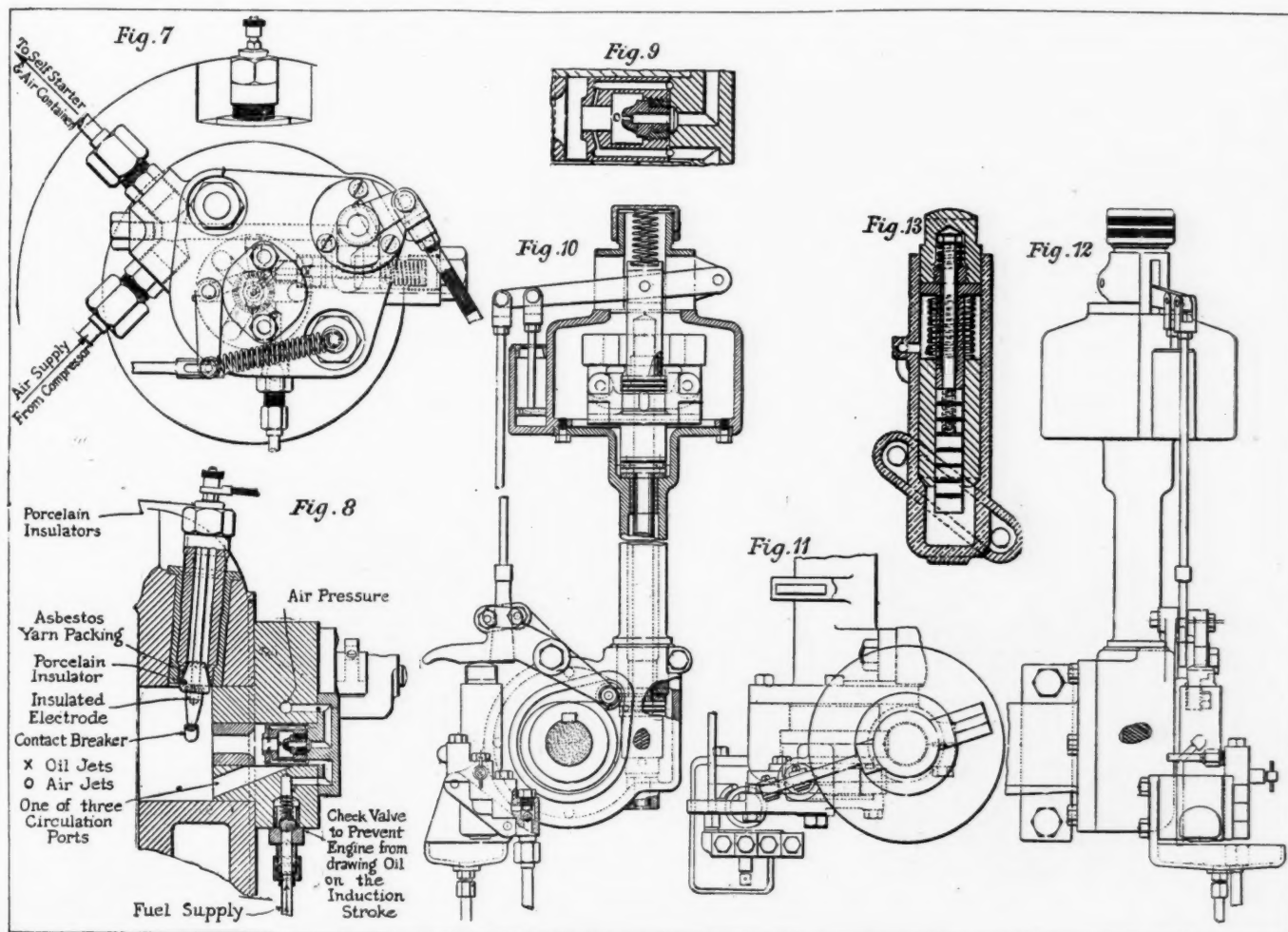
In this engine only 80 lb. per sq. in. compression is used and fuel is atomized by a jet of air compressed at a minimum of 80 lbs. per sq. in., directed by a single acting air compressing cylinder, which is driven by an eccentric from the crankshaft. Either hand or mechanical starters used.

It is a well-known fact that if kerosene is sufficiently finely atomized it can be ignited in a cold engine, and no preheating by running on gasoline is necessary. This has been demonstrated, for instance, by the Beller engine, made in France, which has been described and illustrated in AUTOMOTIVE INDUSTRIES. Another cold-starting kerosene engine is the Blackstone, made by Blackstone & Co., Ltd., an English firm, of which a stationary type was exhibited at the recent Agricultural Show at Darlington. In the Blackstone engine the vaporization of fuel is not due to the use of high compression, as in the Diesel engine, as only 80 lb. p. sq. in. compression is used. The peculiar feature of the engine, and the one to which it owes its characteristic, consists in the mechanical atomizing of the injected oil by means of a jet of compressed air at 80 lb. to 100 lb. p. sq. in. At the side of the cylinder and driven by an eccentric from the crankshaft is a small single-acting air compressing cylinder with a piston of

the plunger type. During every suction stroke of the engine this forces a puff of compressed air from a jet in the cylinder head directed axially along the center line of the cylinder. This jet sweeps through a circular port and picks up the oil which is at the same time being forced through opposite holes in the side of the port, by means of the fuel pumps. The jet of compressed air completes the atomizing of the oil.

We reproduce herewith from *Engineering* a number of sectional views of the fuel feed and control mechanism. The connections at the back end of the cylinder are shown in Fig. 7, while Fig. 9 gives a diagrammatic section through the cylinder head and makes clear the action of the air jet. It will be seen from this illustration that there are three circulating ports in the cylinder head through which part of the cylinder contents are induced to flow by means of an injector-like action of the air jet. These hot

(Continued on page 681)



Original Lubrication Features on Supreme Engines

In this motor, now going into production by a recently organized company, the camshaft is drilled to conduct oil to its three bearings and also to feed oil through drilled holes to the three main crankshaft bearings. A luminous gage in oil reservoir is introduced. Engines will be made in four and six cylinder types, 179 and 249 cu. in. piston displacement.

By P. M. Heldt

A NEW engine for passenger cars and light trucks has been developed by the Supreme Motors Corp., and will be marketed under the trade name Supreme. The personnel of the company includes men with long experience in engine manufacture, and it is planned to produce on a large scale.

For the present two models will be put in production, a four cylinder of 179 cu. in. piston displacement, suitable for passenger cars of 2500-2800 lb. weight and for trucks of $\frac{3}{4}$ to $1\frac{1}{2}$ tons load capacity, and a six cylinder of 249 cu. in. piston displacement, suitable for touring cars of 2700 to 3100 lb. weight. The former engine, known as Model S-Four, has a bore of $3\frac{3}{8}$ in. and a stroke of 5 in., while the latter, known as the Model 5-K, has a bore of $3\frac{1}{4}$ in. and a stroke of 5 in. The closeness of the cylinder dimensions of the two models facilitates production. The two engines naturally are designed along similar lines and may be briefly described as high speed, block-cast engines designed for quantity production.

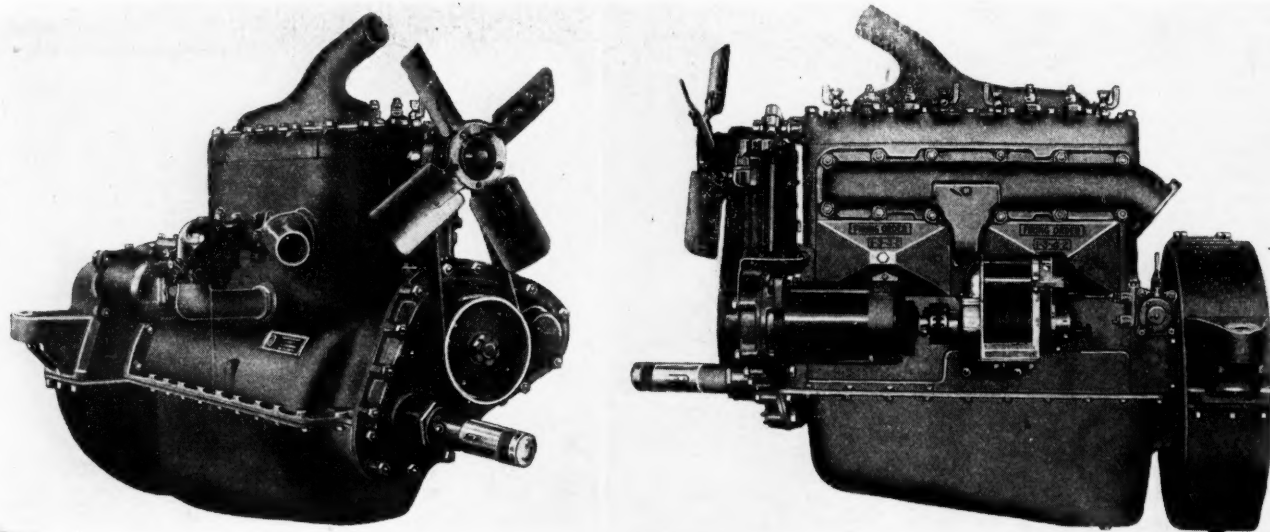
The cylinders are cast in a block and integral with the upper half of the crankcase. The crank chamber portion is strongly reinforced by ribbing to give a rigid support to cylinders, camshaft and crankshaft. The cylinder bores are ground to a mirror finish to standard limits, to provide interchangeability of pistons. To

minimize the side thrust of the pistons on the cylinder walls during the power stroke, the cylinders are offset $\frac{5}{8}$ in. Special pains have been taken to provide liberal water-jacket space around the cylinders, valve seats, ports, combustion chamber and spark plug bosses.

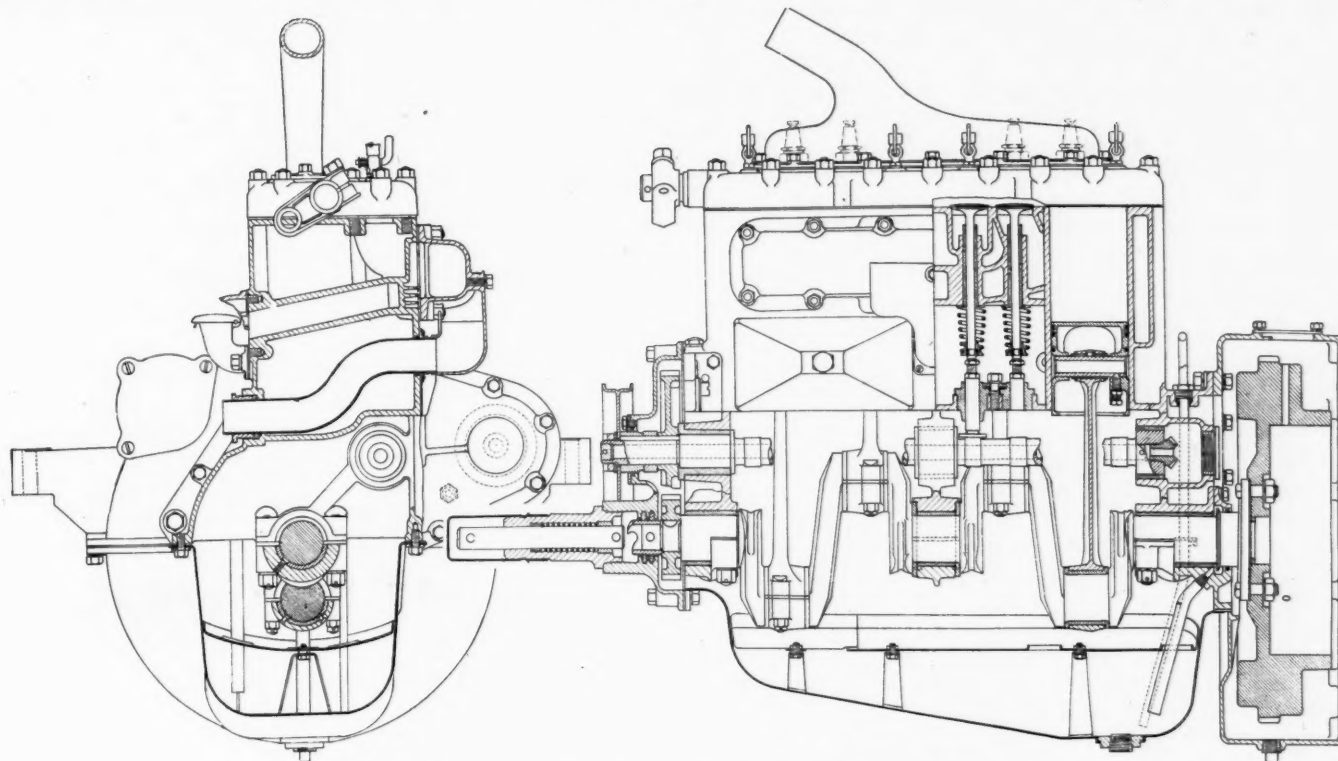
The cylinder head is cast separate from the cylinder block and is secured to it by alloy steel studs, uniformly spaced. The six cylinder model intake and exhaust manifolds are combined in a single casting secured to the left side of the cylinder block. The four cylinder model intake manifold is cast integral with the cylinder block and crosses between the second and third cylinders to the right side of the engine. A hot air stove and tube leading through the cylinder block to a point directly below the carburetor are furnished, so that only a short connection to the carburetor is necessary. The exhaust manifold is a separate casting and is secured to the cylinder block on the valve side.

The oil pan is of pressed steel, with reinforced flanges, and contains a large oil strainer in the oil pan tray, which can be readily removed, allowing all parts of it to be thoroughly cleaned.

The flywheel housing, with integral rear engine support arms, is of cast iron. It is machined and is bolted and doweled to the crankcase. The flywheel is a semi-steel casting and is secured to the crankshaft flange



Two views of the Supreme four-cylinder 179 cu. in. engine



Cross section and longitudinal section of Supreme four-cylinder engine

with six alloy steel bolts. The rim is cut with teeth for the electric starter pinion.

The timing gears are cut with helical teeth. There are three gears, and they are entirely closed. The camshafts are forged with the cams in one piece and are heat treated. Mushroom cam followers are used. The cams and bearings are free from flats and chatter marks and are accurately ground.

The three bearing crankshaft is a drop-forging and has its bearings ground. The connecting rods are of I section. They are carefully reamed to insure perfect alignment of the bearings. Each connecting rod cap is secured by two alloy steel bolts held by cotter-pinned, extra long nuts.

The camshaft, crankshaft main and crank pin bearings are fitted with bronze backed, babbitt lined bushings. Adjustment can be made of the crankshaft main and crank pin bearings by removing one or more of the laminated shims, which are of varying thickness. Each crankshaft main bearing cap is secured by four alloy steel studs with cotterpinned, extra long, slotted nuts, except the four cylinder model center cap, which has only two studs.

Piston Details

The pistons are of cast iron, and, after being rough machined, are annealed to relieve all metal strains. They are finished by grinding. Each piston is fitted with three rings above the piston pin. The lower ring groove is drilled with oil return holes. The piston rings are of the concentric type and are diagonally split. They are ground on the circumference and on both sides. Special care is taken in drilling and reaming the piston pin holes to insure perfect alignment with the outside cylindrical surface of the piston. The piston head surface is polished, to make it more difficult for carbon to adhere to it, and with a similar object in view the machining center is eliminated.

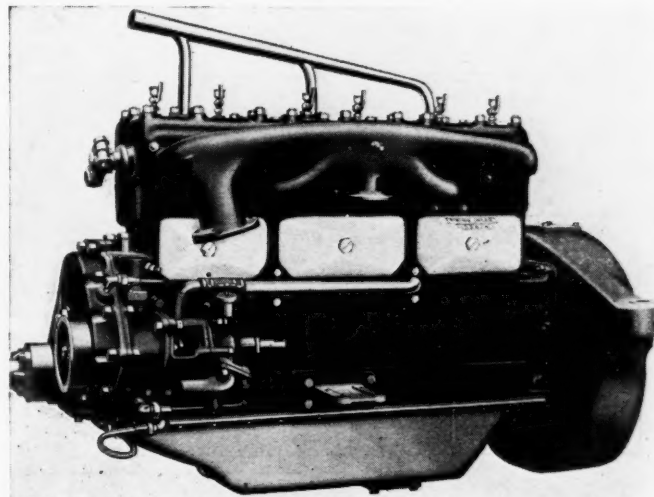
The tubular piston pins are hardened and ground.

They are held in position in the piston bosses by a screw, positively locked by a nut and a mild steel stamping bent up against the flat side of the nut and the screw head.

The crankshaft and flywheel are balanced on balancing machines specially adapted for the purpose. All sets of reciprocating parts in the same engine (which includes the piston rings, piston pin lock screw, piston pin, connecting rod, bolts, nuts and cotter pins) are brought to the same weight, so as to insure the best balanced running.

The valves are operated by a single camshaft and the valve mechanism parts are entirely enclosed. Exhaust and inlet valves are interchangeable, and their stems and seats are ground to size. The heads are of nickel steel and are electrically welded to carbon steel stems with hardened ends to resist wear due to the action of the tappets.

The tappets are of the mushroom type, light in weight, and are hardened and ground. Tappet and valve stem



Supreme six-cylinder, valve side

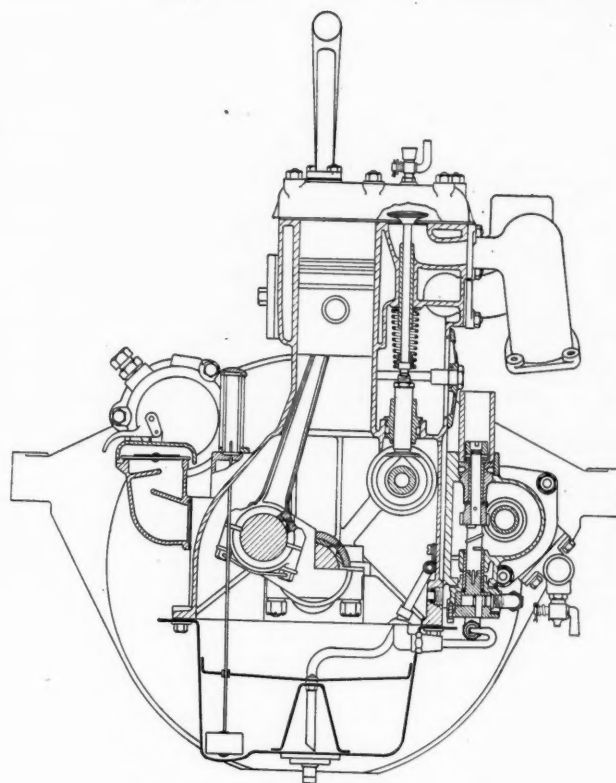
guides are removable. The valve springs are held in position by a machined spring cup and retainer, rather than pressed steel cups as usually employed. The valve mechanism is lubricated by an oil mist from the crankcase, the valve housing being closed by cast aluminum covers held in place by nuts on studs.

Lubrication is by a self-contained full-pressure feed system. An internal gear oil pump is secured to the outside of the engine, where it is immediately accessible. The pressure regulating valve is located on the pump, so the pressure can be readily adjusted to suit different grades of oil and different temperatures. On the four cylinder model the pump is driven by gears off the rear end of camshaft, while on the six cylinder model, it is driven by helical gears off the water pump shaft.

Oil Distribution Pipes Outside Crankcase

The oil tubes are annealed copper tubing clipped to the outside of the crankcase. All connections are made with union nuts. Oil is fed by pressure to the hollow camshaft, which acts as the main oil distributing conduit for all bearings. The camshaft is drilled to conduct oil to its three bearings and also feeds oil through drilled holes to each of the three main crankshaft bearings. This use of the camshaft as the main oil distribution lead is claimed to be an original feature. The crankshaft is drilled from each main bearing to each adjacent connecting rod bearing, to conduct oil to the four connecting rod lower bearings. Oil sprayed from the main and connecting rod bearings lubricates the pistons, piston pins, cam and valve mechanism. The timing gears are lubricated by a separate oil tube leading into the top of the timing gear case, and the surplus oil returns to the oil reservoir. Provision is made for connecting a gage to the oiling system, which can be mounted on the dash.

On the four-cylinder model, the amount of oil in the oil reservoir is determined by a removable bayonet blade



Cross section of six-cylinder engine

type indicator, on which the oil level is marked in quarters. This is inserted into the oil reservoir just forward of the engine rear right support arm.

The amount of oil in the oil reservoir in the six-cylinder model is indicated by a float gage, the upper end of which is enclosed in a glass tube. The tip of the indicator rod is coated with radium, which latter is capped with a transparent substance to prevent oil from discoloring it. This luminous oil gage, which makes it plainly visible at night, is also claimed to be an original feature.

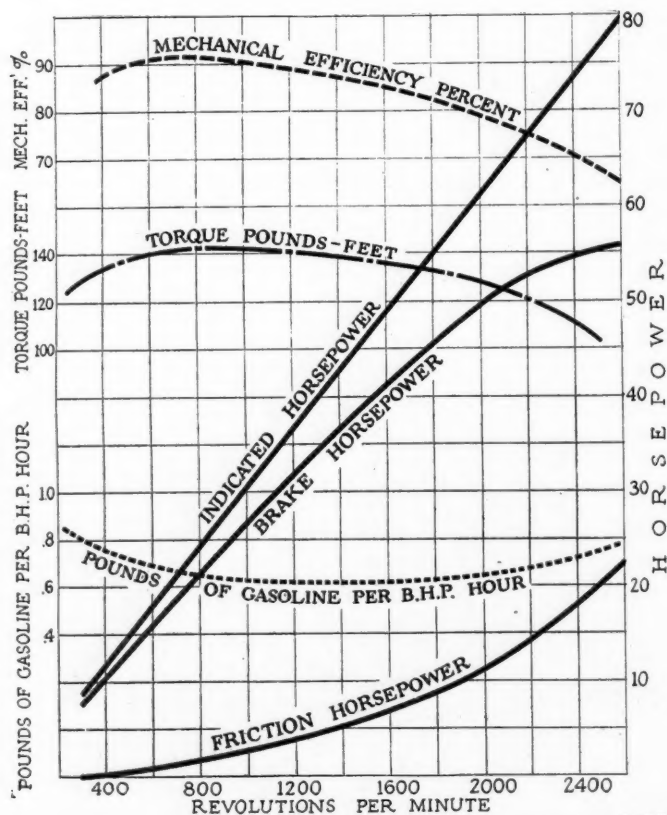
The four-cylinder model is cooled by thermo-syphon. The water outlet casting extends over all four cylinders, while the inlet casting can be adjusted for different angles. On the six-cylinder model a centrifugal pump is used, located on the left side of the engine, bolting directly to the rear of the timing gear housing and driven through a shaft from the timing gears.

The cooling fan is mounted on an adjustable lever and is driven by an endless belt. On the four cylinder model the fan-drive pulley is secured to the forward end of the camshaft, while on the six cylinder it is secured to the forward end of the water pump shaft.

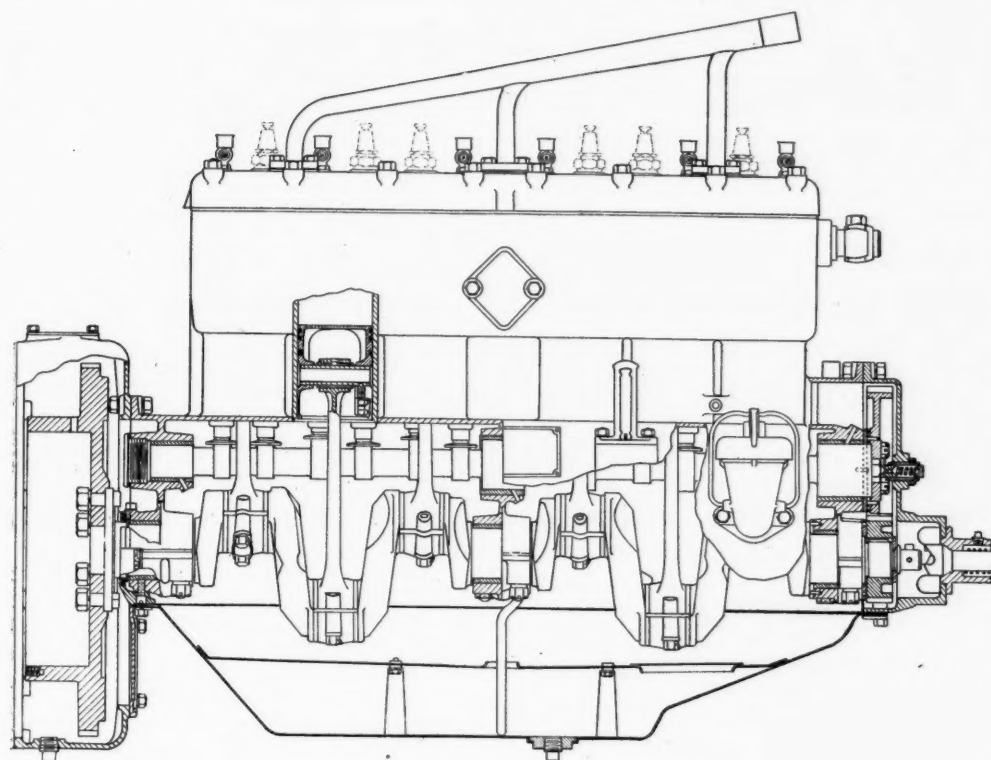
Options Offered on Accessories

Considerable range is provided for individual preference in the choice of special devices and accessories. Carbureter, clutch, electrical units, coil, distributor, starting cranks, transmission, fan, fan belt and spark plugs are not furnished. Provisions are made for standard equipment, and S. A. E. standards are followed throughout. An adjustable fan bracket and its mounting stud, a fan drive pulley, priming cups and generator gear are furnished as standard equipment.

Provisions are made for optional mountings of the generator, with or without ignition distributor drive. On the four cylinder model there is an independent distributor drive off the forward end of the camshaft. On the six cylinder model the distributor is driven by the oil



Characteristic curves of Supreme Six



Longitudinal section of Supreme Six

pump shaft through helical gears from the water pump shaft.

The engines are designed for three-point support, two supporting points being on the side of the bell housing and the third on the timing gear cover, and this latter is said to be a bearing of ample size. This permits the third point to be carried in a split or solid bearing on the frame front cross member or a front suspension cross beam.

The compact design of both models of engine permits of either right or left hand steering. Provisions are made for mounting the carbureter on either the left or the right side of the cylinder block on the six cylinder model.

The four cylinder model weighs 370 lb. without fly-

wheel and 430 lb. with a fly-wheel for a 10-in. clutch. The six cylinder model weighs 560 lb.

Special efforts were made in the design to insure that all parts can be readily adjusted or repaired. Access can be had to the timing gears, for instance, by removing the gear case cover, which also permits the withdrawal of the camshaft, as its bearings are slightly larger in diameter than the cams. The removable cylinder heads give access to the valves, combustion chambers and water jackets. Tap-pets and their guides can be removed without removing the camshaft or valves. Pistons and connecting rods may be withdrawn without disturbing the crankshaft or removing the engine from the chassis, by simply taking off the oil pan. The water pump on the six-cylinder model can be removed as a unit without disturbing the timing gear case cover or radiator.

TABLE OF DIMENSIONS

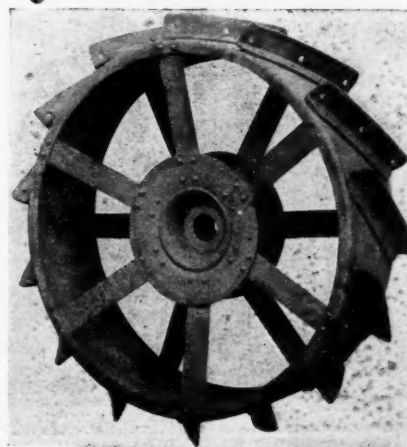
| | Four-Cylinder Model | | Six-Cylinder Model | |
|--|---------------------|--------|--------------------|--------|
| | Diam. | Length | Diam. | Length |
| Camshaft front bearing..... | 2 1/4 | 2 7/8 | 1 1/2 | 2 3/8 |
| Camshaft center bearing..... | 2 1/4 | 1 7/8 | 1 1/8 | 1 7/8 |
| Camshaft rear bearing..... | 1 3/8 | 1 7/8 | 1 1/8 | 1 7/8 |
| Camshaft diameter between cams.... | 1 1/8 | .. | .. | .. |
| Crankshaft front bearing..... | 2 1/8 | 2 1/8 | 2 1/8 | 2 5/8 |
| Crankshaft center bearing..... | 2 1/8 | 2 5/8 | 2 1/8 | 2 5/8 |
| Crankshaft rear bearing..... | 2 1/8 | 2 5/8 | 2 1/8 | 3 1/8 |
| Connecting rod, crank end bearing.... | 2 1/8 | 1 1/8 | 2 | 2 |
| Connecting rod, piston pin bearing.... | 7/8 | 1 1/8 | 7/8 | 1 1/8 |
| Connecting rod, center to center..... | .. | 10 | .. | 10 |
| Valve, outside diameter..... | 1 3/8 | .. | 1 3/8 | .. |
| Valve, port diameter..... | 1 3/8 | .. | 1 3/8 | .. |
| Valve, stem diameter..... | 3/8 | .. | .. | .. |
| Valve lift, 1/8 in..... | .. | .. | .. | .. |
| Piston rings, 3 per piston all above piston pin..... | .. | .. | .. | .. |
| Piston length..... | .. | 4 1/2 | .. | 4 |
| Piston rings width, 1/8 in..... | .. | .. | .. | .. |
| Exhaust manifold takes muffler pipe.. | 2 1/2 | .. | .. | .. |
| Spark plug..... | 7/8 in. | .. | 7/8 in. | .. |
| | S.A.E. | | S.A.E. | |

Tractor Wheel with Composite Hub

A SERIES of tractor wheels employing a composite cast hub is being manufactured by the Whitehead & Kales Co. The hub is of gray iron in which are cast steel flanges to carry the spokes.

These wheels are of three types—tractor rear wheels, tractor front wheels and motor cultivator wheels. All the tractor wheels have a hub with two flanges and flat spokes riveted to it. The rear wheel has a flat rim with an internal lip at each edge to which the two rows of spokes are bolted. Diagonal lugs are riveted to this rim. In the front wheel the rim is composed of two pieces with an external lip on one edge of each. These rims and the ends of the two rows of spokes are riveted together, forming a ridge in the center of the rim.

The motor cultivator wheel has only one flange on the hub and only one row of spokes. The spokes are riveted to internal lips on the edges of the rim, alternating spokes to the opposite flanges.



The W & K tractor driving wheels

Continuous Milling Machine with Fixed Production

This machine is equipped with an unusual form of revolving work table, which is adjustable on the base, in order that work may be placed upon the smallest possible radius and cutter of smallest possible diameter utilized. This table has fixed feed, making production of work a fixed item.

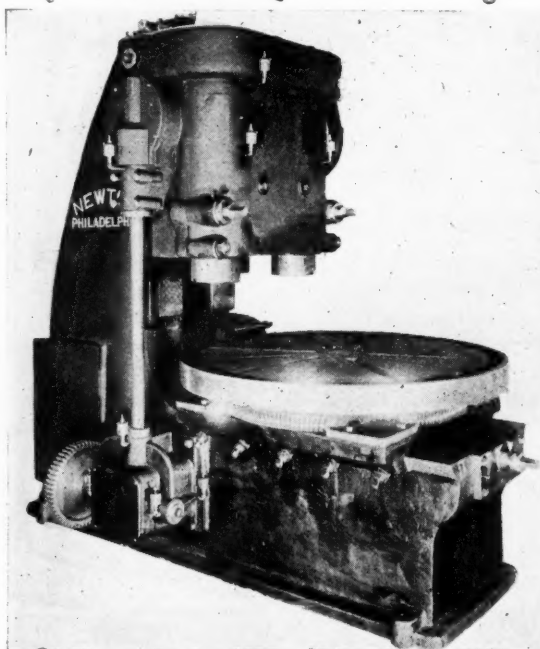
THE latest development in the design of machine tools for quantity production is the use of revolving work tables or work drums adapted to hold a considerable number of the pieces to be machined, the machining operations going on at one side of the table or drum while finished pieces are removed and new ones inserted on the opposite side. The machine can thus be kept in operation continuously, except when it becomes necessary to renew the cutting tools.

We illustrate a two-spindle revolving table type of milling machine manufactured by the Newton Machine Tool Works, Inc. The column and base are cast in one piece for rigidity. The table is circular in form and has provision for mounting various forms and types of holding devices, as required for the rapid machining of a variety of parts.

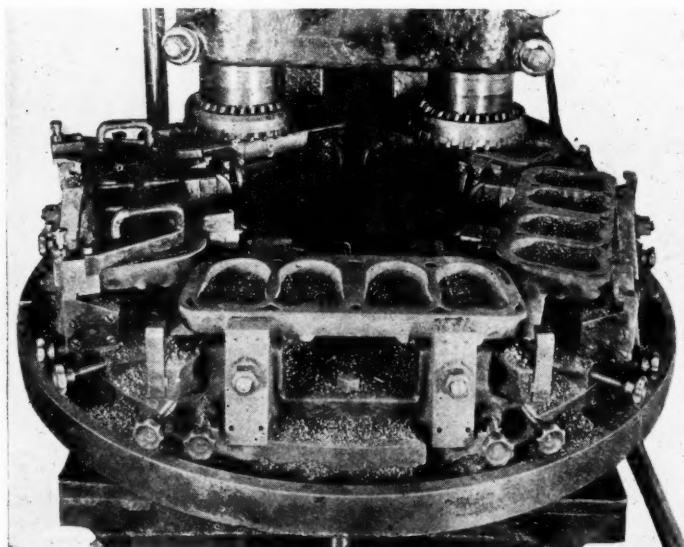
The table is made adjustable upon the base, in order that the work may be placed upon the smallest possible radius and a cutter of the least possible diameter utilized. The advantages of

this adjustment will be realized when it is considered that the production is largely controlled by the number of pieces removed to one revolution of the table; hence it is essential that these be placed with the least possible space between them, whether this space be in the form of an open block, or whether it be of wedge-shaped form, due to the pieces being laid out with too much angularity in relation to each other. This end can be achieved only by making the table adjustable as described.

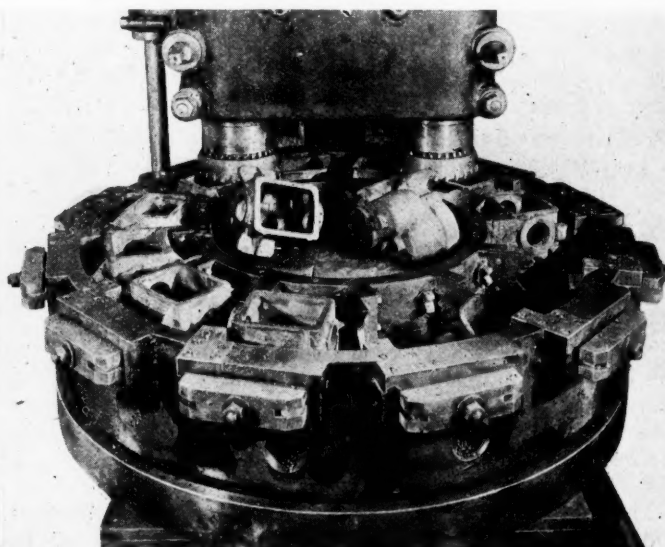
The table may be 24, 36, or 48 in. diameter on its working surface and is surrounded by a pan for draining off the lubricant when working on steel. The adjustment to the table provides for the machining of pieces with a flat surface, or machining pieces of a forked character, in which a gang of cutters are used. The table has a fixed feed, so that there is no possibility of the operator increasing or decreasing the production of the machine, as any holding device passing the loading station will immediately at-



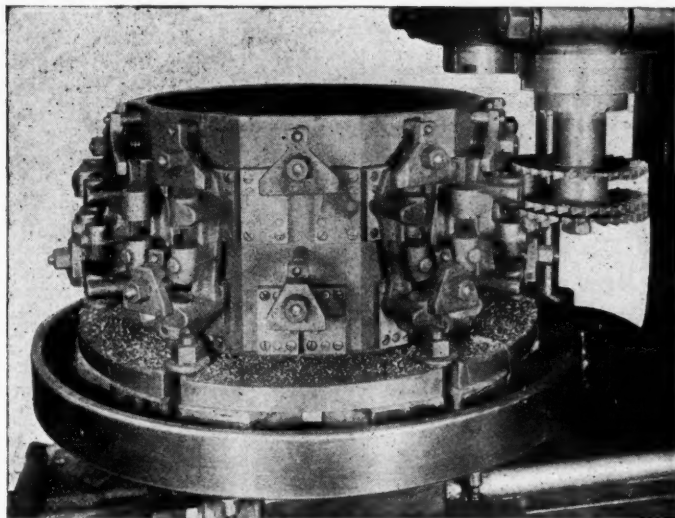
Newton two-spindle continuous miller



Chuckling cylinder head casting by means of gage (seen on left)



Showing malleable iron jig for holding gear boxes to table



Method of facing bosses on a bracket

tract the attention of the man in charge of the section and, in addition to this, as the functions of the machine require so many stations per hour to pass the loading station, that number of pieces must be loaded and unloaded. There is, however, a provision in the feed mechanism by which the rate of feed can be increased or decreased by those in authority.

The spindle head is equipped with two spindles, each of which is individually adjustable for setting the cutters to gages. The left-hand spindle is used for the roughing operation, and the right-hand spindle for finishing. The distance between centers of these spindles varies from 22½ in. on the large machine to 13 in. on the smallest, so that very long pieces can have the roughing operation completed before the finishing cutter starts on the piece.

This is believed to be the most accurate method of machining parts in quantities, because any wear that may occur or any variation in the machining, due to inequality of castings, is absorbed in the finishing operation, and owing to the small amount of work performed by the finishing cutter, accuracy of both finish and dimension is maintained and the cutters require grinding only at long intervals.

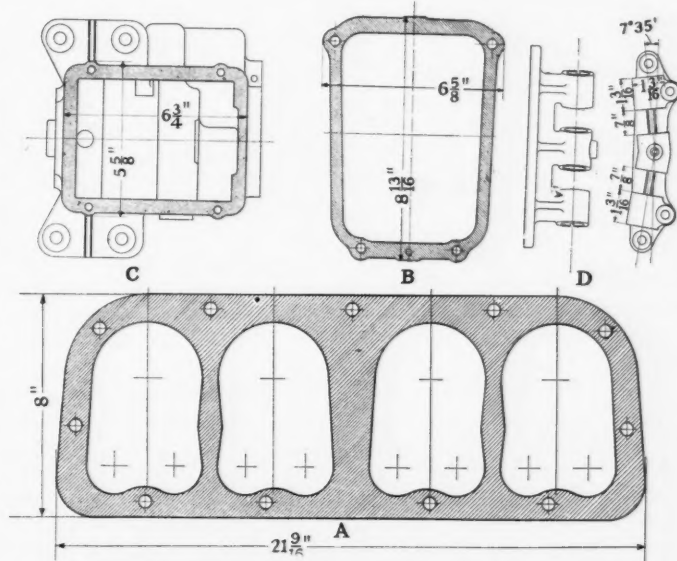
Secondly, since accuracy is insured by the finishing spindle, much higher cutting speeds and feeds can be used than would otherwise be practical. We are informed that 6 x 20 in. pieces have been taken out of the jig and laid on a surface plate when it was found impossible to enter a 0.0015 in. thickness gage at any point. This indicates not only that a high finish was secured but that there was no warpage of the casting, nor any digging in of the cutter on the leading side.

The speeds of the spindles are controlled in the same manner as the feed, as described above. The housing or head carrying the spindles is adjusted on the column, in order that the holding device may set as low to the table as the casting itself will permit. The head is adjusted downward for the minimum extension or overhang to the cutter and spindle. If this head were rigid, a fixed distance above the table, it would be necessary to build a jig up into the air in order to bring the work to the cutters.

One of the elements of design which makes possible the high rates of feed and speed of these machines is said to be the fact that as the work revolves, it presents a constantly changing angle to the cutter. All driving gears are hardened and running in oil, and the combination of a rugged frame, large bearing surfaces, large diameter spindles and a balanced drive eliminates vibration.

One of the illustrations shows an automobile cylinder head in the rough chucked by the gage appearing in the photograph. In other words, the casting is placed in the holding device, the gage set in position, and the casting is then adjusted to the cage, which locates the casting from the combustion chamber, in order to secure uniform combustion chamber volumes. The rate of production of these pieces is thirty per hour.

Another photograph shows a gear case cover or lever stand of an automobile. It will be noticed that these pieces come very close to each other, so that there is no loss of time while the cutter passes from one piece to another. The rate of production with this piece is 120 per hour.



Scale drawings of various surfaces finished in the operations shown by the photographs. A, cylinder head; B, gear case cover; C, gear case; D, bracket

Increasing the Strength of Plywood

PLYWOOD is the name given to wood built up of several thicknesses glued together with the grain in alternate thicknesses running along and across the plank, says Professor Jenkin, in his presidential address to the British Association. The result of this crossing of the grain is that the plywood has roughly equal strength along and across the plank. Plywood is generally built up of thin veneers, which are cut from the log by slicing them off as the log revolves in a lathe. Owing to the taper in the tree trunk and to other irregularities in form, the

grain in the veneer rarely runs parallel to the surface, but generally runs through the sheet at a more or less oblique angle. As a consequence the strength of plywood is very variable, and tests show that it is not possible to rely on it having more than half the strength it would have if the grain in the veneers were not oblique. It is therefore obviously possible to improve the manufacture enormously by using veneers *split off*, following the grain, in place of the present sliced veneers. The superiority of split or riven wood over cut wood has been recognized for ages.

Ignition Circuit Characteristics as Determined by Engine Requirements

It is the purpose of this article to show how the proportions of the primary circuit characteristics of a battery and coil ignition system may be theoretically determined for the production of a spark of definite energy value for an engine of any specified speed and number of cylinders.

By Harry F. Geist, E. E.

THE gas engine of to-day is made in units having from one to sixteen cylinders, and is designed to operate at speeds as high as 3500 r.p.m., although the more usual speeds are between 1800 and 2500 r.p.m.

When it is considered that an ignition system must operate first on closed circuit or "make" and then "break" the circuit to produce a spark, and when it is further considered that certain definite periods of time are required for the energy to establish itself in the coil during the period of "make" and to expend itself in the form of a spark during "break," it must be very evident that the matter of ignition is a very important consideration, especially for the high speed engine having a large number of cylinders.

It is the purpose of this article to show how the proportions of the primary circuit characteristics of a battery and coil ignition system may be theoretically determined for the production of a spark of definite energy value for an engine of any specified speed and number of cylinders. Three charts will be developed for simplifying the determinations for general use and they will be general enough in their nature so as to take in all the conditions that arise in modern ignition system determinations, so far as practical.

It is recognized that such a problem of proportioning is essentially one of an experimental and developmental nature in the design of a working ignition system, rather than one of purely theoretical calculations, principally because of the fact that the performance of the mechanical interrupter has to be determined by experiment and because certain limitations arise due to the iron of the magnetic circuit of the coil that can never be exactly predetermined. Nevertheless it is also recognized that the proper interpretation of the fundamental laws involved in such a problem reduces experimental and developmental work of this kind from a more or less blind groping in darkness to a scientific procedure, and it is in this light that the following discussion, charts and calculations will be presented.

Fundamental Laws Involved

The problem involved is essentially one of producing a very quick acting electrical coil circuit to suit high speed multi-cylinder engines, in which the period of time allowed for the energy to build up in the coil is very small, without cutting down the energy that will be available for delivery to the spark.

The two fundamental electrical laws involved are those of *Time* and of *Energy Storage* expressed in terms of the ignition circuit characteristics.

The time-constant of an electro-magnetic circuit is

known to be directly proportional to the amount of the inductance and inversely proportional to the amount of the circuit resistance and may be mathematically expressed by

$$T = X \frac{L}{R} \dots \dots \dots (1)$$

in which L designates the inductance, R represents the resistance of the complete circuit, and X is a constant involving the completeness of the energizing phenomena and making the equation flexible to suit any value of time that may be considered.

Thus the value of X may be 0.5, 1, 1.5, or 2, etc., as was pointed out in an article, "Energy Distribution Chart for Coils," in AUTOMOTIVE INDUSTRIES of March 4, 1920. By the use of the chart of Fig. 1 of that article the following calculations are made more simple. This chart is reproduced herewith and is shown as Fig. 1.

From equation (1), it is evident that the circuit may be "quickened" electrically by a reduction of L or by an increase in R for any particular value of X , that is, the coil will energize to the degree of completeness represented by X , more quickly with such changes in L or R or both.

But the stored energy involved in such a circuit depends upon the law

$$W = \frac{E^2 L}{2 R^2} \left[1 - 2 \epsilon \left(-\frac{Rt}{L} \right) + \epsilon \left(-\frac{2 Rt}{L} \right) \right] \dots \dots (2)$$

in which E represents the battery voltage and $\epsilon = 2.7183$ the base of the Naperian logarithm system.

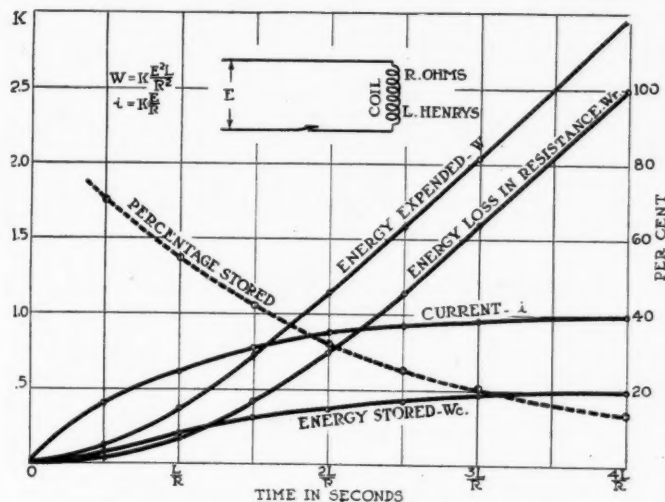
It was shown in the article above referred to that this stored energy equation reduces to the more simple form

$$W = K \frac{E^2 L}{R^2} \dots \dots \dots (3)$$

where K is a constant dependent upon the value X of equation (1) when that equation is substituted in equation (2).

From equation (3) it is seen that a reduction of L , while it quickens the circuit, reduces the amount of energy, and that an increase in R , while it may also quicken a circuit, also reduces the energy very much, owing to the fact that its value is squared.

It would seem offhand from these facts that it is almost impossible to quicken the electrical performance of a circuit without a reduction of the stored energy, yet, since R appears squared in one equation and only in the first power in the other, and because R controls the current flow in the circuit independent of L to a certain degree, it is possible not only to quicken the circuit without a

Fig. 1—Energy distribution chart for coils of constant E , L and R

reduction of the energy, but to even increase the energy if desired. This quickening process will be accompanied by an increase in the current flow, that will also be found to be a very important consideration.

Engine Requirements

A four-cycle engine requires one-half the number of explosions per revolution of the crankshaft that it has cylinders. Therefore, the modern interrupter-distributor type of battery and coil ignition system runs at one-half crankshaft speed.

The time in fractions of second allowed for each complete cycle of the ignition system, including a make and a break of the circuit is therefore

$$T = \frac{2 \times 60}{SC} \dots \dots \dots (4)$$

in which S represents the crankshaft speed and C is the number of cylinders.

From equation (4) it is seen, for example, that an eight-cylinder engine operating at a speed of 2000 r.p.m. allows a time of

$$T = \frac{120}{16000} = 0.0075 \text{ second}$$

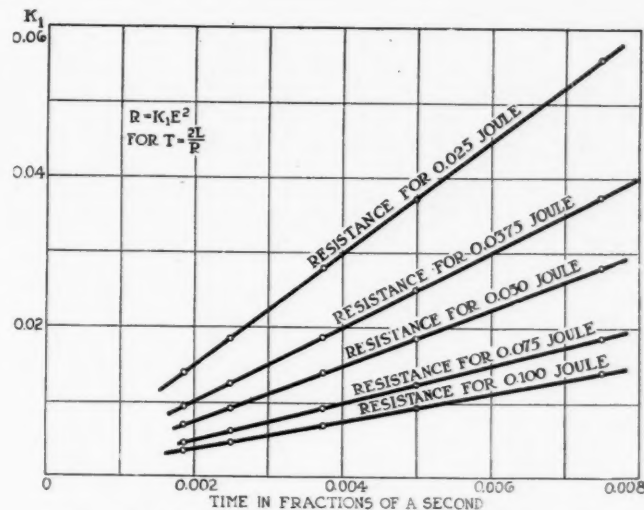
for the functioning of the ignition system in the production of each spark.

It always requires less time for the circuit to deliver the energy in the form of a spark following break than it does for the energy to build up in the primary circuit, but, on the other hand, it is hardly probable that a mechanical interrupter could be designed to operate successfully at 1000 r.p.m. or over and permit much over 50 per cent of the time for the period of "make." The actual time allowed for the period of make will in any particular interrupter design have to be determined by experiment and will be some percentage of the value given by equation (4) for the different speeds it is subject to.

It is sufficient at this time to appreciate that there is a connection between the electrical speed of the coil as shown in equation (1) and the engine requirements as shown by equation (4).

Development of Charts

From a study of Fig. 1, it is seen from the energy storage curve that the amount of energy stored reaches a maximum constant value after a period of make, for any coil regardless of its proportions, of $T = 4 \frac{L}{R}$ or more

Fig. 2—Relation between resistance and time of "Make" for $T = \frac{2L}{R}$

seconds. At this maximum attainable value, the value of the constant K is seen to be 0.50. It is not necessary or desirable to have the circuit closed for such a high percentage of its energization, owing to the unnecessary energy drain on the battery. It is seen that for a value of $X = 2$ instead of 4 or more, the energization will be $\frac{0.374}{0.500} = 74.7$ per cent of the maximum possible for the

coil, and as this represents a fairly high percentage of the maximum for a period of less than half the time required for the maximum value, 2 will be selected as the proper value of X for the following charts.

These charts will furthermore be deduced for values of energy storage ranging from 0.025 joule to 0.100 joule, and the value of the battery voltage E will be carried through symbolically so as not to limit the use of the charts to any one particular value of battery voltage. The values of time used will range between the limits of 0.001875 second and 0.0075 second.

As a sample set of calculations for the charts, let us assume that the circuit characteristics are desired for a coil that will store 0.075 joule of energy in the primary circuit available for a spark during the period of time allowed for make on an eight-cylinder engine operating at 2000 r.p.m. Let us assume that the time allowed for make is 50 per cent of the total time allowed for each complete cycle of the ignition system and is found from equation (4) to be 0.00375 second. The value of K for the assumed value of $X = 2$ is 0.374.

Mathematically it is only necessary to substitute these values of T , W , K and X in equations (1) and (3) and find the particular values of R and L that will fulfill the conditions. This is done as follows:

$$0.00375 = 2 \frac{L}{R}$$

$$\text{and} \quad 0.075 = 0.374 \frac{E^2 L}{R^2}$$

By preparing these two equations for a process of elimination of R^2 and L we have

$$0.075 R^2 = 40 L R$$

$$0.075 R^2 = 0.374 E^2 L$$

From these two equations we find by subtraction that

$$R = \frac{0.374 E^2}{40} = 0.009933 E^2$$

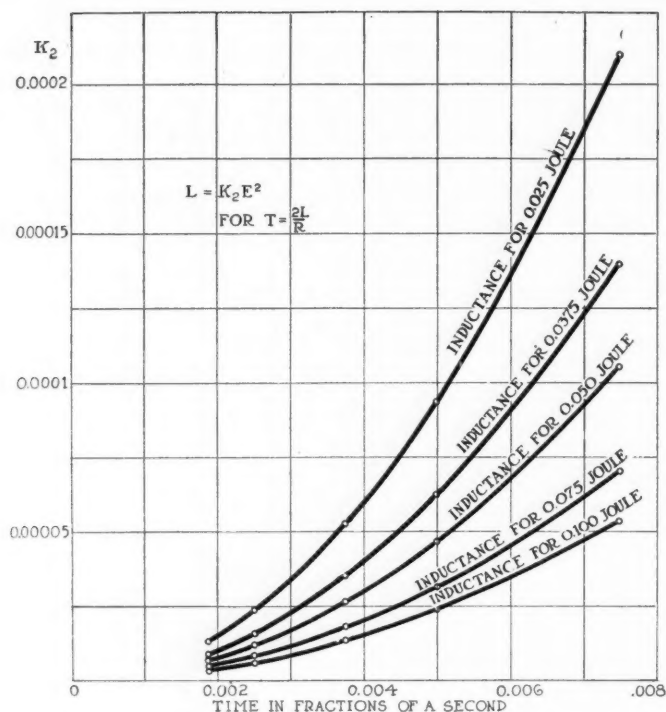


Fig. 3.—Relation between inductance and time of make for $T = \frac{2L}{R}$

which gives the value of the complete circuit resistance in terms of any battery voltage desired. For a battery voltage of $E = 12$, for example, we find that the resistance is equal to $R = 1.34$ ohms.

Thus we can write a general expression of resistance for the charts of the form

$$R = K_1 E^2 \dots \dots \dots (5)$$

where K_1 is a constant that depends upon the values T , W , and X .

Now, by substituting the value $R = 0.00933 E^2$ in the equation for the time, we get

$$L = \frac{0.00375 \times 0.00933 E^2}{2} = 0.0000175 E^2$$

for the value of inductance in terms of battery voltage and which for a value of $E = 12$ gives $L = 0.00252$ henry as the inductance of the coil in standard units.

This gives us the general expression for inductance as

$$L = K_2 E^2 \dots \dots \dots (6)$$

where K_2 is a constant that also depends upon the values of T , W and X .

It is also desirable to ascertain the amount of current flow that the interrupter contacts will be subject to at the instant of break. For the above example this is obtained from the well-known equation for current involved in energy storage

$$I = \sqrt{\frac{2W}{L}} \dots \dots \dots (7)$$

by substituting the values of W and L , and which gives

$$I = \sqrt{\frac{2 \times 0.075}{0.0000175 E^2}} = \frac{92.6}{E}$$

For a battery of 12 volts the current is found to be $I = 7.72$ amperes, while for a battery of 6 volts the current is $I = 15.44$ amperes.

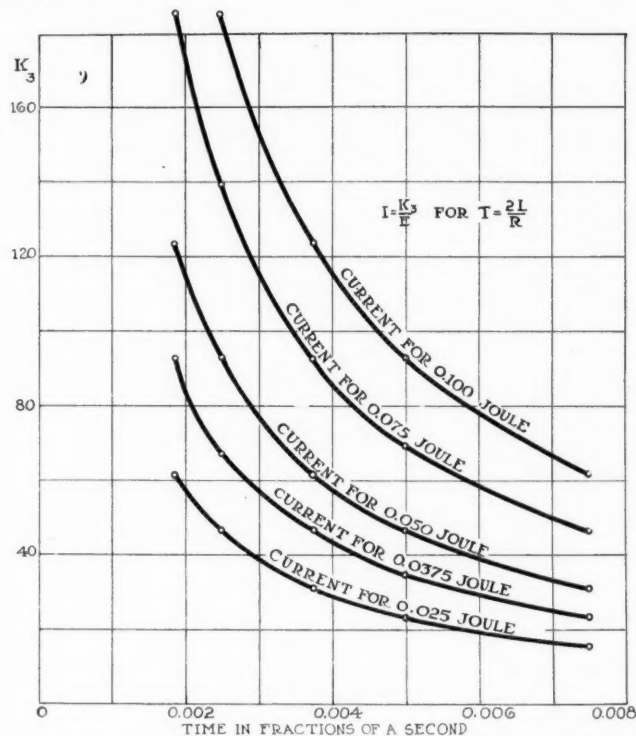


Fig. 4.—Relation between current at break and time of make for $T = \frac{2L}{R}$

Thus we can also write the general expression for current flow as

$$I = \frac{K_3}{E} \dots \dots \dots (8)$$

where K_3 is a constant that also depends upon the values of T , W , and X .

In the same manner as above shown, the values of K_1 , K_2 , and K_3 were found for different periods of make and for the different values of energy storage and were plotted in the charts shown in Figs. 2, 3, and 4.

Thus from the chart Fig. 2, it is possible to determine the amount of the circuit resistance necessary for an ignition system for any desired amount of coil energy storage and period of make between the limits shown, and for any particular battery voltage that it may be desired to proportion the system for.

In a like manner the Figs. 3 and 4 show the amounts of coil inductance necessary and the current amount that the interrupter contacts will be subject to at the instant of break.

Use of Charts

To illustrate the use of the above charts, let us assume that it is desired to proportion the circuit characteristics and determine the current to which the interrupter contacts will be subject for a set of five different ignition systems to be designed for four, six, eight, twelve and sixteen cylinder engines operating at a speed of 2000 r.p.m. These systems are to store 0.075 joule of energy available for the spark when used on a 12-volt battery set. It will also be assumed for convenience that the period of make produced by the mechanical interrupter will be in each case 50 per cent of the total allowance for the complete cycle of the ignition system.

The periods of make will be found from equation (4) to be as per the following tabulation:

| ENGINES AT 2000 R.P.M. | | | | | |
|------------------------|--------|-------|---------|--------|----------|
| Cylinders | 4 | 6 | 8 | 12 | 16 |
| Time of make, second | 0.0075 | 0.005 | 0.00375 | 0.0025 | 0.001875 |

By selecting the corresponding values of K_1 , K_2 , and K_3 for these periods of time on the 0.075 joule energy curves and substituting the value of voltage $E = 12$ in each of the equations $R = K_1 E^2$, $L = K_2 E^2$, and $I = K_3/E$, the correct values of circuit resistance, coil inductance and current are obtained from the three charts for the five different systems.

These values are tabulated as follows:

| ENGINES AT 2000 R.P.M. | | | | | |
|--------------------------|--------|---------|---------|---------|----------|
| Cylinders | 4 | 6 | 8 | 12 | 16 |
| Time of make, second.... | 0.0075 | 0.005 | 0.00375 | 0.0025 | 0.001875 |
| Resistance, ohms..... | 2.68 | 1.785 | 1.34 | 0.895 | 0.671 |
| Inductance, henry..... | 0.010 | 0.00446 | 0.00252 | 0.00112 | 0.00063 |
| Battery voltage..... | 12 | 12 | 12 | 12 | 12 |
| Energy stored, joule.... | 0.075 | 0.075 | 0.075 | 0.075 | 0.075 |
| Current, amperes..... | 3.88 | 5.80 | 7.72 | 11.6 | 15.4 |

A study of the above table shows that the resistance values (which it must be understood includes the resistance of the coil, the internal resistance of the battery and all connections) ranges from 2.68 ohms for the four-cylinder system to 0.671 ohm for the sixteen-cylinder system. The inductance ranges from 0.010 henry to 0.00063 henry for the different systems and the current ranges from 3.88 amperes to 15.4 amperes, being greatest in amount for the requirements of the sixteen-cylinder engine.

Owing to the very high current values found for the twelve and sixteen-cylinder sets, it would no doubt be advisable to equip such a system with a double interrupter or to use two six or two eight-cylinder systems for the engines respectively.

For the lower values of energy storage shown on the charts it is seen that the necessary resistance and inductance values increase and that the current flow decreases.

Coil Size

The circuit proportions shown in the above tabulation are not the only ones that could be given to a set of coils for producing the same results upon the same engines. In fact, an almost unlimited number of circuit proportions could be established for such ignition systems, but the physical size of the coils would be different in each case from that of coils designed from the charts of Figs. 2, 3, and 4.

The physical size of the coils depends upon the value of X selected for the determinations. In the above charts wherein the value of X was selected as 2, the coils and circuits are proportioned for operation at about 75 per cent of their maximum energy storage capacity, which means that the systems designed to operate at 0.075 joule of energy could never store more than about 0.100 joule at their rated battery voltage.

If, however, the value of X had been selected as 1 instead of 2, the coils, it will be seen from Fig. 1, operate at 0.20/0.50 or 40 per cent of their maximum energy storage capacity, and a 0.075 joule system would then be capable of storing as much as 0.1875 joule, meaning a coil almost twice as large as that represented in the charts.

It must be understood that the energy value represented in each of the curves of Figs. 2, 3, and 4 is the stored energy of the primary circuit at the desired instant of break and not the maximum storage capacity of the coil.

The proportions for a set of coils and circuits based upon the same values as for the first set, except that $X = 1$, are shown in the following tabulation:

| ENGINES AT 2000 R.P.M. | | | | | |
|--------------------------|--------|---------|---------|--------|----------|
| Cylinders | 4 | 6 | 8 | 12 | 16 |
| Time of make, second.... | 0.0075 | 0.005 | 0.00375 | 0.0025 | 0.001875 |
| Resistance, ohms..... | 2.88 | 1.92 | 1.44 | 0.961 | 0.72 |
| Inductance, henry..... | 0.0216 | 0.00895 | 0.0054 | 0.0024 | 0.00135 |
| Battery voltage..... | 12 | 12 | 12 | 12 | 12 |
| Energy stored, joule.... | 0.075 | 0.075 | 0.075 | 0.075 | 0.075 |
| Current, amperes..... | 2.63 | 3.98 | 5.27 | 7.9 | 10.5 |

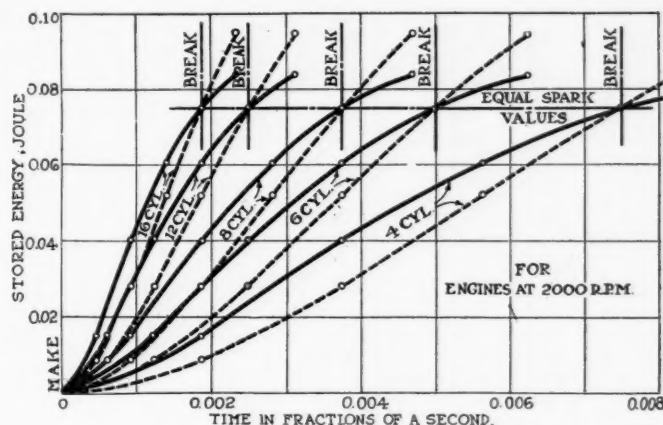


Fig. 5—Energization of coils proportioned for equal sparks

A study of this set of circuit proportions as compared with the first tabulation shows that the inductance is more than double all the way through, and that the resistance is also higher. This has the advantage of a very material reduction in the current amount, but is attained—as was pointed out above—at the expense of a much larger coil. Other disadvantages of this second set of coils based upon the value of $X = 1$ will be pointed out presently.

In order to better illustrate the difference in the behavior of these coils, both as sets and as individual coils, Figs. 5 and 6 are presented to show how the coils energize and how the current rises to a predetermined maximum value during the period of closed circuit in each case.

It will be seen from Fig. 5 that all five of the 75 per cent coils, which are represented by the heavy full lines, reach the same energy storage value in their allotted periods of time for the production of sparks of equal intensity and that the five 40 per cent coils, which are shown by the dotted lines, also reach the same energy storage values in the same allotted periods of time, but that the manner in which they energize is quite different for the two different sizes of coils. The 40 per cent coils seem to be slower at getting started in energizing than is true of the 75 per cent coils, but they energize at a higher rate of increase after they get started.

From Fig. 6 it is seen that there is a marked difference in the rates at which the currents rise to their respective maximum values, and especially that their maximum values are very much different.

These differences are entirely due to the proportions of the circuit characteristics and do not depend upon the amount of stored energy, for it was specifically assumed that the energy storage was to be the same in all cases at the instant of break. It will further be found by a study of Fig. 1 that the energy expended by the battery will be the same per spark produced for all five 75 per cent coils and also the same for all five 40 per cent coils, but that the energy expended in the case of the 40 per cent coils will be less.

Uniformity of Coil Performance

The behavior of the ignition systems, as shown by the energization curves of Fig. 5, in each case is based upon an engine speed of 2000 r.p.m. But engines operate at speeds that will vary from their starting speed up to their maximum rated speed, so that it is essential that the performance of the ignition system at different speeds be taken into consideration.

It was shown that the 0.075 joule systems based upon a value of $X = 2$ could not store any more than 0.100 joule of energy for their rated battery voltage, regard-

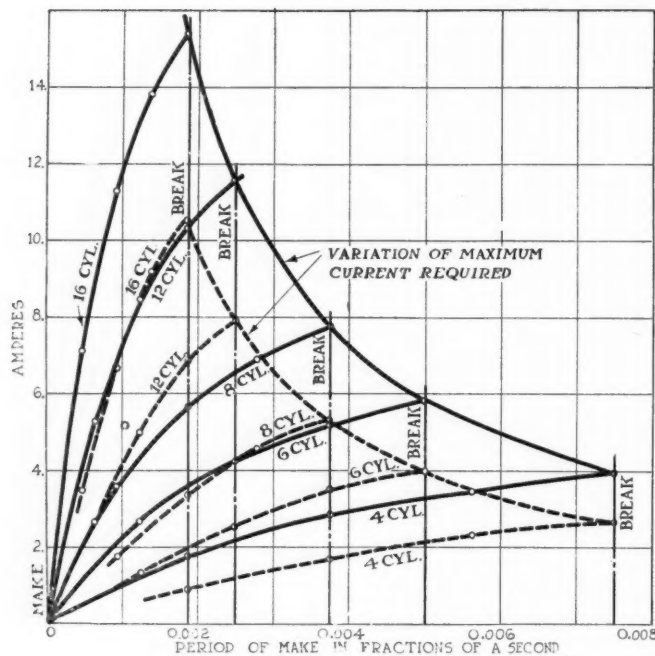


Fig. 6.—Current performance of coils proportioned for same spark value but for different engines

less of how long a period of make was allowed. It will be seen from Fig. 5 that for engine speeds higher than 2000 r.p.m. the energy stored will decrease, due to the reduction of the period of closed circuit, so that by means of Fig. 5 it is possible to foretell the change in sparking performance of the system with engine speed changes.

This brings out a very decided difference between the 75 per cent and the 40 per cent coils, for in the case of the 40 per cent coils it is possible to store almost double the amount of the energy at very slow engine speeds as in the 75 per cent coils. It will, furthermore, be seen that as the period is decreased at higher speeds, the stored energy drops off much more rapidly for the 40 per cent coils than it does for the 75 per cent coils. This means that the 75 per cent coils will be very much more uniform in their performance for different engine speeds than is true of the 40 per cent coils, so that it is evident that the value of X , besides materially affecting the size of the coil, affects the uniformity of its behavior as well.

Fig. 7 shows the comparative uniformity of energy of three different coils, based upon different values of X (1, 2, and 3). The coils are also proportioned to deliver equal sparks on an eight-cylinder engine at 2000 r.p.m. From these curves, it is seen that between any speed limits, say from 50 to 150 per cent of the rated speed, the system based upon $X = 3$ will be most uniform, while that based upon $X = 1$ will vary most.

The higher the value of X selected, the better this uniformity becomes, but it carries with it the very decided disadvantage that the current flow necessary increases very much and the energy output by the battery per spark produced runs high. The value of $X = 1$ requires the least amount of current and the electrical efficiency is also highest, but it has the disadvantage in that the coil will be larger than necessary and the spark energy will be rather non-uniform, so that the value of $X = 2$ was selected as a means to give a fair uniformity for different speeds and moderate current values.

In the foregoing paragraphs, the discussion, calculations, and results obtained are based upon purely theoretical laws which assume that the values E , R , and L are constant in any particular system. This is a false assumption in a measure, in the case of the usual ignition

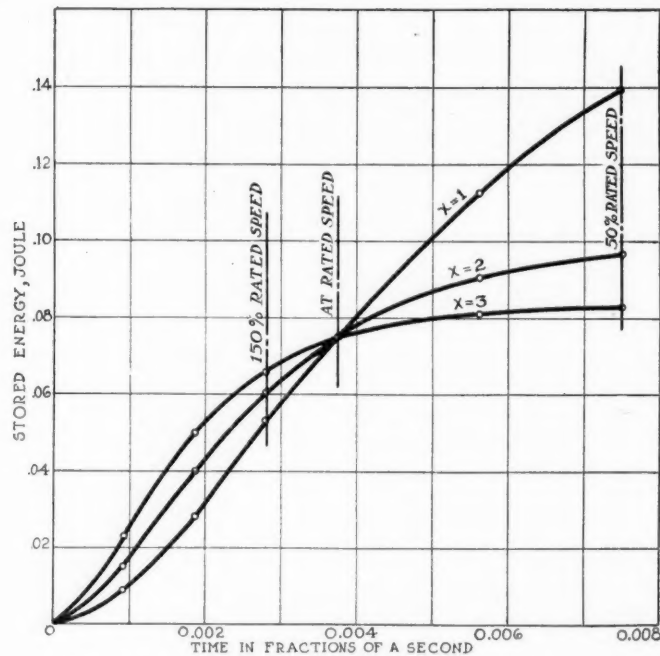


Fig. 7.—Energization of coils based on different values of " X " showing differences in performance uniformity

system, so that it might be advisable before concluding to point out the difference that arises between the theoretical and the actual energizing phenomena.

The amount of magnetism that will be established in interlinkage with the primary circuit of the coil will depend upon the magnetizing force represented by the winding. This force is equal at any instant to the current flow multiplied by the number of turns in the primary circuit, so that as the current flow increases during the energization of the coil, the amount of magnetism increases.

The usual ignition coil employs an iron core for its magnetic circuit, so that as the magnetism in the core increases, its density may become sufficiently high that some of the flux is forced to take paths outside of the iron core and thus will not be in as complete an interlinkage with the windings as it would otherwise be, meaning that the inductance will undergo a decrease in value for the higher densities.

The general result of this decreased inductance, which takes place gradually as the coil energizes, is that the energy will reach its maximum value a little more quickly than would appear from the theoretical assumption of a constant inductance.

However, the discrepancy between the actual and the theoretical phenomena is not sufficient to destroy the value of the theoretical results. In fact, their close agreement serves to prove the true value of the fundamental laws expressed by equations (1) and (2).

A comparison between the actual and the theoretical current phenomena accompanying the energization of a typical ignition coil was made in Fig. 3 of an article, "Energization of the Ignition Coil," in Vol. XLI, page 824, of AUTOMOTIVE INDUSTRIES. This diagram showed that as the coil becomes nearly fully energized a slightly larger current actually flows than would be expected on theoretical grounds, and it also shows that the performance will be more nearly uniform than indicated by the theoretical curve.

The results agree so closely, however, that the value of the charts Figs. 2, 3, and 4 in determining ignition circuit characteristics for different engine requirements is evident.

Job Analysis Successfully Applied to Office Force

Job analysis has been found effective in cutting out waste effort and reducing office forces to a minimum in the experience of a large automobile concern. The results attained and methods used in achieving them, related in this article, are of particular significance at this time.

By Norman G. Shidle

ECONOMY of expenditure and elimination of waste has become more important than ever in view of the prevailing situation in the automobile industry. Not only are renewed efforts being made by manufacturers to perfect production processes and methods with a view to eliminating every inefficient phase of factory work, but office forces as well are being subjected to a closer scrutiny than ever before. This scrutiny has to do both with finding workers who are not essential, and with readjusting methods of work in such a way that all office routine may be performed at a minimum of effort and with the smallest possible working force. It is also effective in determining lines of promotion and in finding those employees most deserving of advancement.

While this angle of administration is particularly prominent just now, its real importance is always very great. Over a year ago some interesting work was done along these lines at the Packard Motor Car Co. Job analyses were made in several office departments and valuable results were achieved. While the entire organization has not been covered by these analyses, the results obtained in those departments where they have been made prove them to be of definite value both in eliminating lost motion and improving office methods. Consequently the way in which these job analyses were carried out, together with the effects produced by them, are useful as an example for other firms interested in similar investigations.

The work of making these studies at the Packard plant was done by the assistant office manager, M. A. Cudlip. The first step was to sell the idea to the head of the department in which the analyses were to be made. It was felt that little of real value could be achieved unless all those who came in contact with the plan understood it thoroughly and became enthusiastic about it. That is, the possibilities for good would have been reduced immeasurably had the work been begun with only the weight of authority and without the weight of conviction behind it.

The idea and purposes of the job analysis, then, were first explained to the department head. He was sold on its usefulness, chiefly by having the aim and advantages pointed out to him. Some of the chief of these are:

- a. The job analysis is primarily for the use of the office employment manager. It enables him to understand thoroughly the detailed requirements of each job; to select men intelligently; and to provide for the department head a more efficient group of workers than would be possible were he to rely upon his own judgment and a cursory survey of the various jobs.
- b. It provides information for the employment department which is available to anyone who does the hiring. If a new employment interviewer were necessary because of the usual

employment man's illness, absence or retirement, the same information would be available and the new man would be able to familiarize himself with the necessary qualifications for the various jobs in a very short length of time. Otherwise it would take him months.

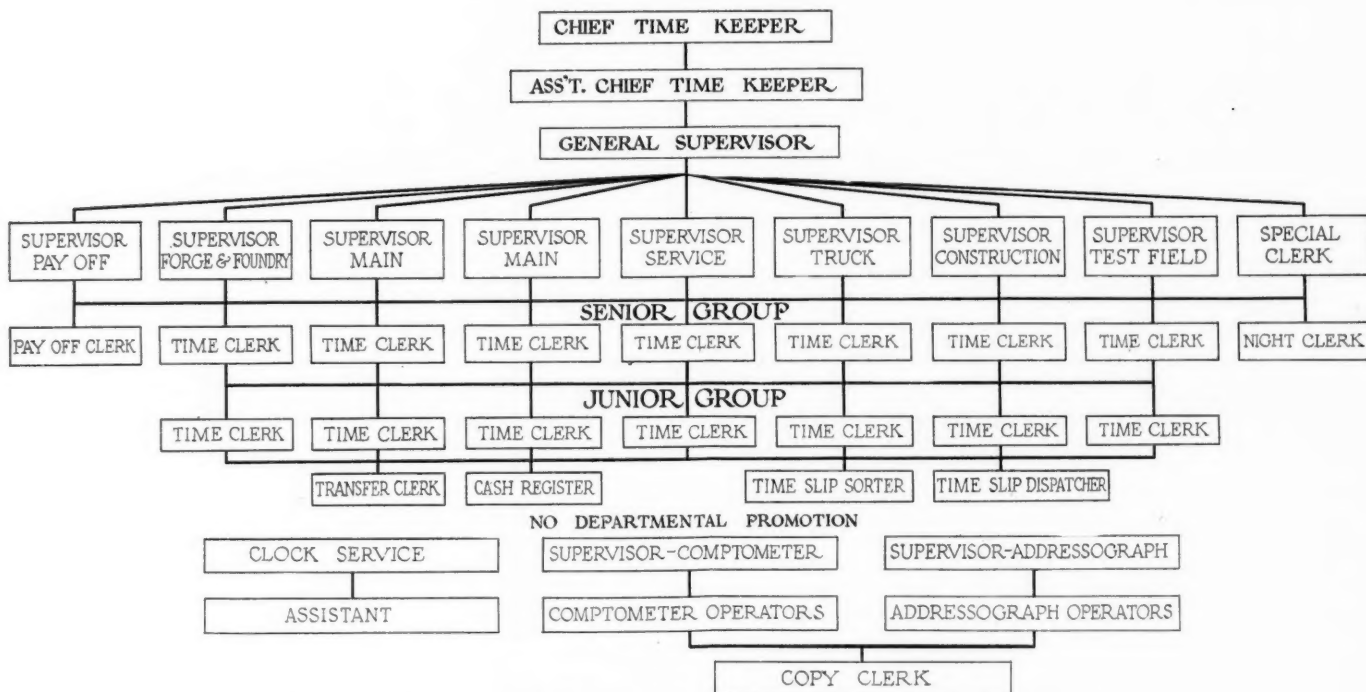
- c. An accurate knowledge of all the jobs in the department, together with their relation to one another, will make possible the elimination of some jobs and the combining of some others.
- d. The employee will get a clearer idea of exactly what he is expected to do and will consequently be able to accomplish his task more effectively.
- e. It will be possible to give every employee all the work he can handle, both as to quantity and quality, thus allowing him to exercise his ability to the highest degree.
- f. The co-ordination of activities prevents overlapping work by two or more persons.
- g. An immediate and temporary advantage is that the investigator is able to determine those employees who understand their work thoroughly and who are capable of assuming more responsibility; and he can determine those whose grasp of their functions is slight.

Every department head knows in a general way the duties of the various persons in his department, but job analyses frequently reveal things to him that he never knew before; and he is able to carry out the work of his department more effectively as a result.

Having sold the idea to the department head, the next step is for the investigator to "make friends" with the personnel of the department. He must explain that his purpose is not to "fire" anybody. It is simply to find out what work must be done in the department, how it is being done, and what improvement may be made. In a large organization it is usually possible to provide elsewhere for any employee who is eliminated from a particular department as the result of a job analysis. This should be made clear to the employees at once. The job analysis will give every employee an opportunity to develop as far as his abilities permit and will allow him to assume all the responsibilities of which he is capable. It is for the benefit of the employee as well as the company.

It is well to begin office job analysis work in a department where much of the work is routine. One of the first departments studied at the Packard plant was the time-keeping department; this will serve as a specific example for this discussion of methods. In this department many persons are doing the same job, so that analysis is easier to make and wider in its application when completed.

The investigator sits down beside one of the employees and asks that the employee explain just what his job is. When the employee has done this in detail, the investi-



Organization chart showing possibilities for promotion within department

gator goes over it, asking that the employee correct him should he make a mistake. This done, the investigator writes down the results, taking each step of the job in its order and listing the details of the employee's activity in connection with it. This record comprises the investigator's idea of what the job is.

The investigator may ask the employee to perform the operations for him, when the job is such that this can be done—as in the case of a time clerk. All the forms used are laid out, and their various uses explained by the employee. This serves two purposes: it allows the investigator to determine the employee's knowledge of what his job really is in relation to other jobs in the department, and it brings to light any superfluous forms or operations which may be buried under red tape.

Having completed this verbal explanation, the employee is asked to write out in his own words his conception of his job; its functions, importance, etc. There are then two written analyses of that job; the one made by the investigator and the one made by the employee himself. These are submitted to the head of the department for approval and comment. The investigator confers with the head of the department concerning the accuracy and justice of the analyses, and as a result of this conference the data for the final analysis is made up.

Following is a sample analysis for the job of time clerk, as it appears in its final form. Much of the data, it will be noted, is determined from a careful interpretation of the information gathered; it is not merely a listing of that information.

JOB ANALYSIS

Position

Time clerk.

Department

QA.

Educational and Personal Requirements

A time clerk should be a graduate of the eighth grade of grammar school, and should be able to multiply and add with accuracy and rapidity. Neatness and good penmanship are essential prerequisites for this work.

Age Limits

18 to 35 years.

Necessary Experience

Previous training or experience should consist of one year of time-keeping experience in a large business organization using standardized methods and forms. An equivalent of this experience will be satisfactory.

Source of Supply

Office schools, regular employment agencies and business schools.

Permanency

The position is permanent for the person who shows ability and capacity for the work of a time clerk.

Duties

All time slips from a department are received by the time clerk to whom the work of that department has been assigned. The clerk arranges the time slips into a bundle according to their roll numbers. Then the amount of wages is computed or determined.

A time clerk must be thoroughly familiar with the three different methods which are used in the computation or determination of the amount of wages in order that he may be able to compute any time slip which he may receive.

These methods are as follows:

1. Premium Time Method

This method utilizes the Packard Premium Wage Tables, a mathematical compilation for facilitating computations of wages. One table is listed for every job requiring for completion from 10 to 100 Standard Time Hours, including tenths of the hour. That table is found which agrees with the number of Standard Time Hours as given on the time slip. Under the Rate Per Hour and opposite the Elapsed Time Hours for each time slip is found the amount of wages. These Wage Tables can be used only when the Elapsed Time Hours are not less than half the Standard Time Hours, or when the Standard Time Hours do not exceed 100.

In such cases a computation is necessary, and this special formula is used:

A. Standard Time Hours minus Elapsed Time Hours equals the Gained Time Hours.

B. Gained Time Hours times the Rate Per Hour divided by the Standard Time Hours equals the Rate Gained Per Hour.

C. The Rate Gained Per Hour plus the Rate Per Hour equals the Total Rate Per Hour.

D. The Total Rate Per Hour times the Elapsed Time Hours equals the amount of Wages earned.

or:

Std. Time Hours — Elapsed Time Hours × Rate Per Hour

Standard Time Hours

Quant. Rate Per Hour \times Elapsed Time Hours = Amount Earned.

2. Piece Work Method

In this method the amount of wages earned is determined by multiplying the number of pieces accepted by the Rate Per Unit.

3. Day Work Method

The number of Elapsed Time Hours is multiplied by the Rate Per Hour to compute the wages earned by this method.

The amount earned on each time slip is then posted to the Pay Ledger Sheet, which is totaled at the end of the pay period. The columns on the Pay Ledger Sheet are totaled as soon as the necessary figures are posted. After totaling the Clock Card, it is balanced against the Pay Ledger Sheet. If the hours do not check, the time slip entries on the Pay Ledger Sheet are compared with the manila copies of the time slips which are retained in the Time Office. This comparison furnishes the information for the Over and Short Report, which determines the amount of the correction credits and debits to be entered on the Pay Ledger Sheet. In making out this Report, if the time slips show more time than the Clock Card registrations—time is Over; but if the time slips show less time than the Clock Card registrations—time is Short.

After all necessary adjustments have been made, such as advances during the pay period, the Net Pay is determined. The Pay Voucher and Pay Envelope are then filled out properly.

A time clerk is also required to compute and fill out all Pay Offs which come through in his department. This is done by preparing an Advance Pay Voucher and Receipt, which must be countersigned by the Cash Register Voucher Clerk before the employee receives his money. Also all changes in rates in his department are properly recorded by him.

In addition to this, some of the time clerks are required to assist the Paymaster in preparing the Pay Envelopes and paying off the factory employees on pay day.

Nature of the Work

Although the work is routine in its general character, it is not monotonous, because each clerk follows her own work through to completion. The responsibility of the time clerk for the accuracy and rapidity with which her work must progress should prevent her from becoming disinterested or lax in its proper performance.

Specific Importance

Each time slip must be figured with the greatest care and speed. A mistake may result in unrest and inconvenience among the employees, while the Pay Roll must be completed on time.

Opportunities for promotion exist for those who prove to be valuable and capable employees. In such cases, arrangements will be made so that the employee may receive training in our Office School to prepare himself for his next advancement.

The promotion chart will graphically represent the logical and possible steps of advancement for a time clerk in the QA Department.

Many of the advantages which accrue from the job analysis are not evident from a perusal of this form, which is merely the final record kept in the files of the employment department for its use and guidance. In one department, for instance, where job analyses were made, it was possible to reduce the working force from 133 to 67 without any loss in productive work. This saving cannot be attributed solely to the results of the job analysis, but it is safe to say that the job analysis played an important part.

An important result of the job analysis is the definite marking out of possible lines of promotion. It is recognized that one of the greatest incentives to good work, especially among ambitious office workers, is the possibility of advancement. When the job analyses had been completed in the time-keeping department, for instance, the promotion chart shown in Fig. 1 was drawn up. While the chart as shown here is not entirely correct at the present time, it illustrates clearly the principle involved: that of charting definitely the possibilities of advancement within a department.

"In many ways, the problem of job analysis in the office presents a more difficult proposition than that of job analysis in the shop," Mr. Cudlip said recently, "yet the results that may be obtained are adequate to prove its value. Common sense in applying job analysis to office work is, of course, very necessary; methods of doing it are still in a state of development; it is a comparatively new application of a familiar principle. Consequently it is well to begin with jobs that obviously will bear analysis and give promise of yielding results commensurate with the effort involved in making the investigations. Slow and useful progress of this work is of value; widespread application in a short space of time is likely to cost the firm more than it saves, and at the same time cause ill feeling."

There is no doubt as to the value of the job analysis as a method of detecting weak spots in an organization and of obtaining data upon which to base a calculation as to the most efficient way of carrying out the work. As in any other activity, however, which involves personal contacts, the personality and ability of the investigator will play a large part in determining the ultimate success of the work. Especially is this true of a task of this kind for which few accurate rules of procedure have yet been determined.

The work at Packard is of special interest because it has been carried out in a conservative and effective manner, and has produced practical results in a comparatively short space of time.

Treatise on Electroplating

THE history of the art of electroplating, a discussion of the theory of the subject, and a description of the latest practice is embodied in "Electro-Deposition of Metals" by Dr. George Langbein and William T. Brannt. The volume is published by Henry Carey Baird & Co. and appears as the eighth revised and enlarged edition.

While in the main a translation of Dr. Langbein's original book, both the translator and the revisor have added to this volume their knowledge of the subject, especially as regards recent American practice.

The new edition pays particular attention to the practical innovations adopted since the publication of the previous edition, and presents the most recent machinery and apparatus, such as the latest types of plating ma-

chines, ball bearing grinding and polishing lathes, sand blast apparatus for cleaning and lacquer spraying by compressed air. It also considers the use of electrically heated japanning and lacquer baking ovens. Practice in plating dynamos is dealt with in detail as well as the recent developments in the use of storage batteries.

THE London *Economist* states that index of British commodity prices for August is 7743, decline of 133 compared with July, showing resumption of downward trend beginning in April, which was interrupted by July rise. Miscellaneous items alone showed rise during August. Textiles dropped 73, cereals 61, other foods 7, minerals 5½ points.

Export Customers Point Out Our Export Sales Mistakes

There is an immense field for truck and tractor manufacturers in the Latin American countries. Important buyers of these vehicles are coming to this country to get them. These men point out the great need in these countries is for proper demonstration of vehicles and instruction.

By Harry H. Dunn*

PROMINENT men from Mexico and Central and South America who are interested in the use of motor trucks and tractors in agriculture and in general transportation in several of the republics to the south have been passing through New Orleans in numbers during the past month, several of them on their way to confer with Government experts on transportation and agriculture, at Washington; others to pay visits to several of the state agricultural colleges, and still others on buying expeditions for trucks and tractors, on which they will visit the leading factories of automotive vehicles.

The writer has interviewed not less than a score of these visitors in the past thirty days in an effort to get a line on just what Latin-America wants in the way of American automotive vehicles and how she wants them delivered. From a comparison and a sifting down of the statements of all these men two points stand out:

1. All believe that the trucks and tractors should be shipped flat to Latin America, and assembled in shops established there, either by separate factories, or by one large, centrally located plant, supported by several such American manufacturers, in each of the three natural divisions—Mexico, and Central and South America.

2. Latin America needs:

First, automotive road-building machinery, of such type that it could be used afterward in the maintenance of the large number of roads virtually every country is building;

Second, automotive agricultural machinery, whereby the tremendous uncultivated tracts in every one of these republics could be put into production;

Third, motor trucks of 2 to 10 tons, for long-distance use, over mediocre roads, in the interior, where, in many of these countries, the rail lines have not yet penetrated.

Here are statements from a few of them:

H. Rosas and L. Rodriguez, lumber manufacturers, importers and exporters and large farm owners of Durango, Mexico, said:

"The American automobile and truck and tractor exporter is his own enemy in Mexico, where he has no competition, and has had none since the European war began. He is his own enemy solely because he does not study the needs of truck and tractor users and 'prospects' there. We cut about 80 per cent of the lumber produced in Durango, or about 2,000,000 ft. of pine and oak each month, yet we have been compelled to come to the United States to see trucks and tractors in operation and to select the automotive machinery we need in our timber work and on our farms.

"If the truck and tractor manufacturers of the United States would send demonstration trucks and tractors into

Mexico, and assemble their machines in that country, adding here and there little improvements or make minor changes to suit the demands of the Mexican operators, they soon would have a market for such exports second to none in the world. We will purchase at least ten motor trucks and five tractor units on this trip into the United States. The manufacturers could have saved us two months' time and two or three thousand dollars by having demonstration camps in Mexico for these machines."

Albert Vasquez, of Tegucigalpa, capital of Honduras, who is engaged in long-distance hauling, mainly by mule train and 16-mule wagons, and who handles the mails from the capital to remote parts of the country, on contract, spoke for Central America:

"All the Central American republics are turning their attention to good roads, in the building of which engineers from virtually all the armies are engaged. What we need now is motor trucks for those roads, to replace the slow, costly, and never certain mule trains; and tractors for the sugar and fruit plantations as well as for the handling of mahogany and other lumber and dyewoods.

"Yet if we want to know anything about trucks and tractors, we have to make a trip of several weeks into the United States to learn. I will give an American firm, or several firms together, land and a building, rent free for ten years, if they will establish a truck and tractor demonstration post in Tegucigalpa, and I am quite sure there are men in other Central American countries who will do the same thing, while every government there will aid in every way the introduction of working motor vehicles."

Teodoro Bowen, a dyewood exporter of Guayaquil, who is touring the lumber camps of the South to get an idea of how portable sawmills and tractors are used in this industry here in order to apply these methods in the forests of Ecuador, said:

"All Central and South American countries have been invited to send military aviators to United States Army aviation schools, opening Oct. 1. Guatemala, Venezuela, Ecuador, Peru, Chile, Bolivia, Paraguay and Cuba have accepted. But there is no school to which we can send our young men to become proficient in the handling of motor trucks and tractors—a vastly more important industry—important to all Latin-American countries, and to American manufacturers of automotive vehicles.

"If we want men to handle the trucks and tractors, which are coming into great demand all over Latin-America, we have to send them into the factories of the United States, as common laborers, or we have to buy trucks and tractors 'in the dark,' as it were, and then stand the losses and damages of the experiments of untrained drivers and mechanics. The undeveloped truck

*Correspondent Class Journal Co. at New Orleans.

and tractor business of South America alone is worth millions, not in turn-over, but in profits, to the manufacturers of the United States, and I believe the greatest step in the development of this business, now virtually without competition from European manufacturers, would be the establishment of demonstration plants, where trucks and tractors can be assembled, where service can be given on the trucks and tractors working in our country, and where our young men can be trained to be competent motor mechanics."

Gov. Eyre Hutson of British Honduras, while in New Orleans on his way to London, in August, said:

"We are at last building a system of good roads radiating from Belize to all parts of the colony, but we are not well-informed as to what types of motor trucks the

colonial government should put on these roads for the carrying of mails and general freight."

Naturally, British trucks will have the preference in British Honduras, but the official opinion here given is identical with that of the operators of automotive vehicles quoted above.

Even on the islands of the Caribbean a demand for trucks and tractors is growing. Carlos L. Estrada, owner of six sugar plantations at Pinar del Rio, Cuba, who came into the United States through New Orleans, to buy six 10-ton motor trucks for himself, and five others for neighboring planters, declared that it is impossible to get any idea of the qualifications, maintenance, operation, work or cost of upkeep of any American truck or tractor in Cuba, without coming to the United States.

Ney Draw-in Collet Chuck

A DRAW-IN collet chuck which can be tightened without the ordinary long tube through the lathe spindle and the hand wheel at the extreme rear of the machine is now being offered by the J. M. Ney Co. One of the advantages of this new chuck is that it leaves the entire opening in the lathe spindle free of obstructions. Thus, in doing lathe work or milling on a long broach, for instance, the work may be fed out of the chuck as the operation progresses. The chuck is also adaptable to the milling machine, grinder or drill press.

Each chuck is furnished with six collets, ranging in capacity from $\frac{3}{8}$ to 1 in., advancing in steps of $\frac{1}{8}$ in. Since each collet may be used on work $\frac{1}{32}$ in. over or under size, considerable flexibility is provided.

The chuck consists of body A, sleeve B, nose piece C, adapter D and a binding key E. The nose piece has threads

on the outside which run in a threaded portion of the sleeve. Turning the sleeve produces a longitudinal travel of the nose piece, which is locked against rotation by a key in the body, fitting a keyway in it. This longitudinal travel brings the nose piece against the collet, causing it to draw in by being forced into the ground, cone-shaped opening within the body. This opening fits a similar conical shape on the outside of the collet. Great pressure is obtainable with the gear teeth on the sleeve and the pinion key E.

The longitudinal thrust imparted to the sleeve is taken up by a row of 26 ball bearings. The sleeve is knurled for hand tightening. Collets are changed by turning the sleeve till nose piece C comes out entirely. This makes them readily accessible.

The body and other members are made of machine steel, pack hardened and accurately ground on all working surfaces. The collets are made of tool steel, ground. The adapter, which is of cast iron, is furnished in a semi-rough condition. It has three drilled and counter-bored holes properly spaced to fit into three tapped holes in the body.

The portion of the adapter which enters the body is made considerably larger than the hole in the rear of the body, to insure concentricity of the chuck when it is being adapted to various machines. It is customary to grasp the adapter in a chuck for threading to fit the spindle of the lathe on which it is to be used. After that the adapter is screwed home on the nose of the lathe and there the front end is turned to a snug fit for the hole in the body.

Fig. 2 is intended to illustrate the chuck's holding qualities and rigidity. Here a 1-in. cold-rolled bar is protruding from the face of the chuck $5\frac{1}{2}$ in., and it is said to be easily possible to reduce the bar to $\frac{1}{2}$ in. in diameter with a $\frac{1}{32}$ -in. feed without springing of chuck or work.

A New Solvent

IN a recent communication to the American Chemical Society at St. Louis, Professor V. Leuber stated that the selenium oxychloride obtained as a waste product on the electrolytic refinery of copper had remarkable solvent properties. It dissolved all the unsaturated hydrocarbon such as acetylene, benzene, toluene, etc., whilst the paraffin hydrocarbons such as gasitive kerosene and the mineral waxes were unaffected. Some vegetable oils react violently with the selenium oxychloride. This easily dissolves vulcanized rubber as well as the unvulcanized material and Bakelite waterproof casein glue, asphalt and bitumen, also dissolve in the oxychloride. The reagent also extracts the bituminous material from soft coal, leaving a carbonaceous residue.

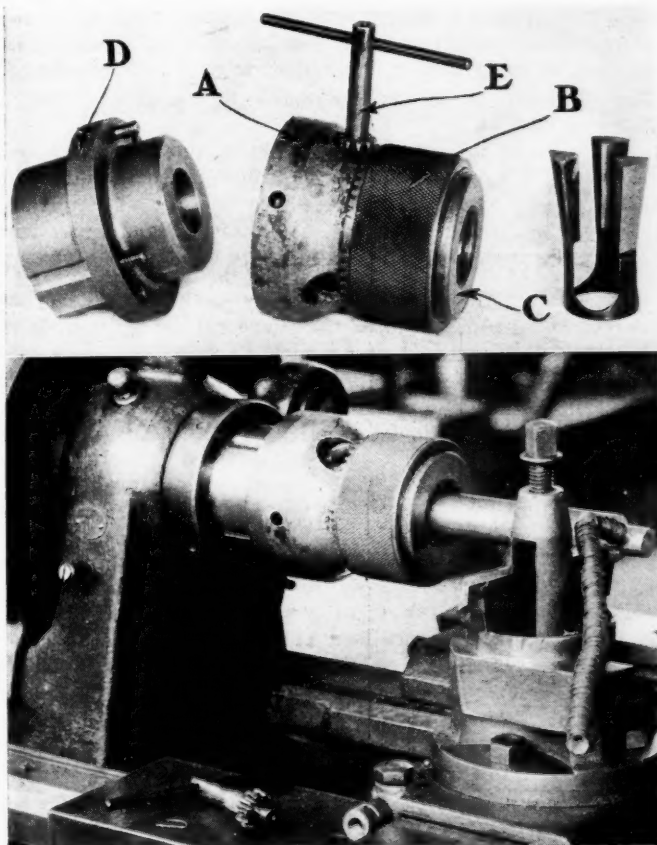


Fig. 1—Ney draw-in collet chuck in parts
Fig. 2.—Illustrating rigidity of Ney collet chuck

Jugoslavia Has Large Automotive Trade Possibilities

Here is a fertile agricultural country of 13,000,000 people that knows little of motor transportation except as seen during the war, nothing of the possibilities of motor farming, waiting for the American manufacturer to come, educate them and reap the sales harvest.

By Capt. Gordon Gordon-Smith*

NO country in Europe offers such opportunities for the manufacturers of automobiles, motor trucks, tractors or motor boats as Yugoslavia. This State was formed by the grouping around Serbia of the Kingdom of Montenegro and the Serbian-speaking provinces of Austria—Croatia, Bosnia, Herzegovina, Istria, Carniola, Carinthia, Slavonia, Dalmatia, the Slovene country, the Batchka and the Banat of Temesvar.

Eight years ago Serbia was a little country of 2,500,000 inhabitants. By the victorious war against Turkey in 1912, the Sandjak of Novi Bazaar and Serbian Macedonia were added to the Kingdom, bringing the total inhabitants up to 4,500,000. The success of the Allied arms has added the Serbian-speaking province of the Austrian Empire, with their 7,500,000 inhabitants, while the decision of the Kingdom of Montenegro to merge its existence in the new State, had added 500,000 more. King Peter, therefore, to-day reigns over 13,000,000 people, inhabiting one of the richest countries on the face of the globe.

For Yugoslavia is fabulously rich. She possesses twenty million acres of virgin forest only waiting the axe of the lumberman. Her mineral wealth is immense. She has gold, silver, mercury, copper, zinc, lead, coal, iron and half a score of other minerals in large quantities, not 1 per cent of which has been exported.

But the forests and mineral resources do not exhaust the wealth of Yugoslavia. There are also her agricultural riches. The Batchka and the Banat of Temesvar, the famous wheat belt of Southeastern Europe, are among the most fertile countries in the world. The valley of the Morava, the Shumadia region and the rich mountain valleys of Bosnia and Herzegovina further contribute to the agricultural wealth of the country.

There is, therefore, in Yugoslavia in general, and in Serbia in particular, a vast field for the development of the automobile industry. There is a demand for cars of all kinds—the higher class and speedier vehicle for the roads of Croatia, Bosnia, Herzegovina, Istria, the Slovene country and Dalmatia, where there are miles and miles of well built, well kept roads and the more robust and solidly built cars for the mountains and valleys of Serbia, where the roads have deteriorated.

It will also be necessary to install and equip repairing stations in all the chief centers, as there is a considerable want of skilled labor of this kind. Thanks to the training acquired during the war, there are now several thousand men who know the automotive engine, but they would probably need a good deal of expert supervision.

*Intelligence Section, Headquarters Staff, Royal Serbian Army.

At the moment, this field of industry is entirely open. The German and Austrian automobile industry, which formerly had a monopoly of such business as existed in the country in pre-war days has not become aggressive. This constitutes America's opportunity. Of the future prosperity of Yugoslavia there is not the slightest doubt. Six months after the armistice was signed, she had 100,000 tons of grain for export after all the domestic needs had been satisfied. The Batchka and the Banat of Temesvar is the most fertile country in the whole world and a source of unlimited wealth.

Thanks to the railway policy of the Austro-Hungarian Empire which, with a view to holding down a population it knew to be radically hostile to its rule, constructed nothing but strategic lines, the country is short of about three to four thousand miles of railroads. The construction of these, under the most favorable circumstances, will be a matter of years and until then railway transportation will have to be replaced by road motor transport in order to carry out the exploitation of a country that is fabulously rich in natural products of all kinds, lumber, minerals and agricultural produce.

There exists in Yugoslavia a total of about 16,000 miles of roads. In Croatia, Bosnia, Herzegovina, Dalmatia, the Batchka and the Banat these are mostly of excellent quality. In Serbia, however, six years of ceaseless war did an enormous amount of damage to the existing routes.

The type of motor truck necessary for use in Serbia is therefore one of the more robust kind, able to stand fairly rough traveling. The immense and far-reaching damage done to the railways by the Germans and Bulgarians during their retreat renders the use of motor transport for some time to come imperative.

It will also be necessary to establish repair shops in all the principal centers as the enemy made a clean sweep of machinery of every sort and kind before and during the retreat.

Up to the declaration of war in 1914 German and Austrian manufacturers had almost a monopoly of supplying motor vehicles to Serbia and Yugoslavia generally. After the war, though motor trucks were sent to Serbia in large quantities by the Allies, they consisted exclusively of military transport vehicles. Most of these are to-day ready for the scrap heap, the only trucks of any value being those imported to Salonica for use in the final offensive in 1918. But even these suffered much during the actual operations and have now little value.

Another reason for the urgent need of motor transport is the dearth of draft animals. Up to 1914 the horse and

the ox were the only means of traction. But these perished by tens of thousands during the fighting and most of those that remained were driven off by the retreating enemy.

With the repair shop a supply of skilled labor will also have to be sent out to Yugoslavia. As the population is, to an overwhelming extent, composed of peasants, the amount of mechanical skill in the country is very small. It is true that during four years of war several thousand Yugoslavs were trained as chauffeurs for the military transport. But these men possess little beyond a rule of thumb knowledge of the automobile engine. They may be able to look after them and execute minor repairs, but they are quite wanting in the expert knowledge necessary for executing major repairs on a large scale. They could, at best, act as assistants to better trained chiefs.

There is no doubt that with its thirteen million population Yugoslavia offers a wide field for the American motor industry. Agencies and warehouses could be established at all the principal centers for the sale and repair of motor vehicles. These are: Belgrade, with a present population of over 200,000 (before the war only 90,000); Agram, the capital of Croatia, 80,000; Laibach, capital of the Slovene county, 60,000; Sarajevo, capital of Bosnia and Herzegovina, 50,000; Uskub, 45,000; Novi Sad, the principal town of the Batchka, 40,000; Ragusa, capital of Dalmatia, 10,000; Spelato, the principal port of Dalmatia, 30,000; Nish, the second city of Serbia, near the Bulgarian frontier, 30,000; Monastir, the capital of Serbian Macedonia, 50,000; Cetinje, the capital of Montenegro, 5000, and Podgoritz, 20,000.

The fact that Yugoslavia is overwhelmingly agricultural in its character makes it a most important market for motor-driven agricultural machinery of every kind. The use of this is almost unknown in Yugoslavia so that for this industry it is almost virgin soil.

Over 25,000,000 acres, or 42.5 per cent, of the total superficies of Yugoslavia is under cultivation. Of these over 17,500,000 acres are under wheat and Indian corn; over 1,000,000 consist of orchards and kitchen gardens; over 5,000,000 acres are meadow land and nearly 1,000,000 acres are vineyard.

The land holding, especially in Serbia, is largely in the hands of peasant proprietors. In Serbia more than half the arable land (55 per cent) is divided into properties of less than thirteen acres; 41 per cent are properties averaging from 13 to 50 acres and only 4 per cent are large properties. These properties would, for the most part, be too small to justify the use of agricultural machinery were it not for the existence of the Zadrougas and the extraordinary development of the co-operative system.

The Zadrouga is a village or hamlet, composed of families, generally blooded relations, who cultivate the soil in common. Each owns his agricultural land, while the meadow land is held in common. These organizations have been much studied and praised by many scientists in foreign countries as perfect economical and moral organizations. There has, however, of late years been a tendency to replace these somewhat patriarchal institutions by rural co-operative societies. This system has been wonderfully developed in Serbia and in Yugoslavia generally.

Before the war there were in Yugoslavia 3890 Slav co-operative societies, with 477,000 members; 390 Hungarian societies with 113,000 members and 130 German co-operative societies with 52,000 members, a total of 4410

societies with 622,060 members. Their capital amounted to 600,000,000 francs and the annual movement of business to 2,000,000,000 francs.

These societies belonged to different categories, societies for credit, consumption, purchase, mutual help, agricultural production, wine growing, milk preserving, etc.

It is through the Zadrougas and the co-operative societies that the use of motor agricultural machinery could be introduced and popularized. The moment is the more favorable for this that the enormous losses in horses and cattle renders the finding of some new method of traction an imperative necessity.

But as the peasant mind, especially in the Balkans, is eminently conservative, a certain amount of education and propaganda will be necessary to demonstrate the immense advantages of motor traction and motor power in agricultural work. A beginning in this direction has been made by one of the leading firms of Minneapolis deciding to lay out and equip for demonstration purposes a thoroughly up-to-date model farm in the vicinity of Agram,

Another problem is the question of purchase, with Yugoslav currency in its present depreciated condition. But a country of such immense natural wealth, with its 20,000,000 acres of virgin forest, its marvelous mineral resources and immense agricultural riches, should be able to find a solution of this problem, in the beginning, probably, by some system of barter such as has been successfully inaugurated between Switzerland and Holland and Germany.

There is also a great field for the motor boat industry. Yugoslavia possesses a network of noble rivers, the Danube, the Save, the Drava, the Drinn, the Drina, the Theiss, the Morava and the Vardar. The Danube is, of course, navigable throughout its entire length, from Vienna to the Black Sea. On Austrian territory it is linked up with the largely developed canal system of central Europe, through which the Belgian and French canal system can be reached, thus placing Yugoslavia in direct water communication with the Atlantic and North Sea ports.

The Save is navigable from Shishak to the sea and the Theiss from Szatmar to its junction with the Danube. The task of making the other rivers navigable offers no insuperable engineering difficulties. When this is accomplished and the Morava is united with the Vardar by a short canal, it will be possible to barge goods from the Atlantic and North Sea ports right down to the Aegean, thus putting Salonica in direct water communication with Havre and Antwerp.

All this will increase the importance of the rôle which the motor-driven boat is called upon to play, the more so as the recent discovery of oil in the Slovene county gives prospects that Yugoslavia will soon be able to obtain gasoline supplies, at least in part, from her own sources of production.

A PROPOSED method of protecting aluminum and aluminum alloys from corrosion consists in browning the metal electrolytically. The aluminum is suspended in an electrolyte consisting of a sulphur compound of molybdenum, and zinc is used for the anode. The cell is maintained at a temperature of 60 to 65 deg. The aluminum is soon covered with a dark brown coating. The metal may be bent or rolled without cracking the coating. A piece of aluminum thus coated is stated by the inventor of the process to have been immersed in a salt solution for two months without showing the slightest trace of corrosion.



The FORUM



A Body Builder's View on Truck Standardization

Editor AUTOMOTIVE INDUSTRIES:

THE main difficulty the average body builder has to contend with when receiving his order for a body is the question of chassis measurements.

If he is operating his plant in a small community away from the dealer, he is invariably compelled to wait for the delivery of the chassis to his shop before he can lay out his working plans and proceed accordingly. This causes long delays which are not only aggravating to the dealer and customer, but costly as well. A chassis lying idle represents an investment earning no interest—an economic loss which cannot be regained.

In the larger centers, where the dealer is a progressive, he furnishes the builder with blue prints showing exact measurements of his chassis and thus helps speed things up, as the builder can go ahead constructing his body, and have it ready for mounting when the chassis arrives.

We must consider, however, that a great many bodies are built in the small centers, and the great confusion of measurements now existing among the different makes of trucks is a great source of annoyance and trouble to this type of body builder. He will not go ahead and construct his body, as he is afraid, on account of past experiences, that after he has done so and tries to mount same on the chassis, he will find that he will be forced to make costly and radical changes in the body in order to make it fit, and he consequently refuses to start his work until he has the chassis in his shop, where he knows that his measurements are correct.

Dealers and distributors all over the country have been setting up a great chorus of protest over the delays caused by the body builder's holdups, and rightly have they done so. Let all of us join in this chorus, body builders as well, and direct our efforts on the right parties—in other words the manufacturer himself.

The truck manufacturer is just as much interested in having his chassis go into active service, with the least possible delay, as is the dealer, and here is where he can help: *Standardize*.

As we now find it, there is a vast difference in the various makes of trucks in the way of body dimensions, such as wheelbases, controls, frame widths and lengths, driver's seats and rear wheel dimensions.

The question of frame widths and rear wheel dimensions, speaking of the solid tire equipped chassis, are the main troubles of the body builder. Take, for example, the 2-ton chassis. Here we find frame widths varying from 32 to 36 in. and more, and in rear wheel dimensions from 34 to 40 in. If a standard could be set, say of 34 in. on frame widths and 36 in. (which is the prevailing size now used) on rear wheels, there will be no room for doubt in the body builder's mind as to just how to proceed with his work.

Length of frames back of driver's seat should also receive attention. Here we find great differences. Of course, we must have various lengths of chassis on account of the different classes of service trucks are placed

in, but by standardizing on, say, regular, long and extra long, this feature can be overcome.

Driver's seats and controls should also be looked into. Of course, standards will have to be set for each model such as 1, 2, 3½ tons, etc., but in the end it will help to do away with present conditions and help facilitate the body builder to speed up the placing of the truck into productive service,

CHAS. A. HINDMAN,
President, Hindman Body Corp.

New York City.

Front Wheel Wobble

Editor AUTOMOTIVE INDUSTRIES:

RELATIVE to Ludlow Clayden's investigations and article on the subject of "The Wobble of Front Wheels," he states that generally this is evident at slow car speeds. Can he give an explanation as to the cause of the following?

A few months ago a high class car which, however, had been considerably used, had a pronounced front wheel wobble, at exactly 35 m.p.h., and this was produced as badly when the car was driven on cement or brick roads. At this speed it was almost impossible to hold the steering wheel still, but when strength was applied to the steering wheel to restrain it, the rear end of the car oscillated violently sideways.

Thinking that this was caused by a rotating part, I had a new universal joint fitted in the propeller shaft, and it had some effect in reducing the force of the oscillation. Also a new worm was fitted to the steering gear and all the joints fitted tightly up. These adjustments, however, did not appear to affect the cause of the oscillation, which to-day still remains a mystery.

THE BREWER MANIFOLD COMPANY,
Robert W. A. Brewer.

Dayton, O.

R. W. A. Brewer has apparently encountered a case of wobble which is not to be even partially explained by the theories propounded in my recent article on the subject. Let me again state that I do not think I have discovered the whole answer by any means, and it is my belief that there are other factors outside those which I mentioned.

Knowing Mr. Brewer's long racing experience, I hardly like to suggest that his special case was caused by an unbalanced wheel, but a wheel with a really heavy spot on its circumference will produce a wobble of just the character he describes.

I think, but have no complete proof of it, that a lack of parallelism between front and rear axles can be a contributing cause. I get this idea from a single instance of a car which normally had exceptionally good steering but which wobbled at all speeds when the shearing of one of the front spring bolts allowed the front axle to move about three-quarters of an inch out of place on one side only. I also had a case of wobble which was cured by changing front springs, and the change at the same time cured a previous tendency to hunt the right hand side of

the road. Investigation of the discarded springs showed that one of them had the center bolt three-eighths of an inch out of place. In this case, care was taken that the king pin axis was not changed with the springs.

It would be interesting to know whether Mr. Brewer did or did not balance the road wheels; if he did I am frank to confess I have no other suggestion to offer.

A. LUDLOW CLAYDEN.

Truck Prospects in Barbados

Editor AUTOMOTIVE INDUSTRIES:

THE following local information from the island of Barbados may be of interest to American truck manufacturers:

There is at present a remarkably inefficient "Government mismanaged" railway which produces a yearly loss of considerable proportions. Freight charges are to be raised to meet this, or in the event of this measure not proving acceptable to the local "Parliament," the railway is to be shut down.

There is, undoubtedly, a large number of prospects to be found for truck sales among all the sugar planters, and this applies especially to the districts served at the moment by the railway, as the planters will have to pay the bill for all losses to date on the railway undertaking.

The present mode of transport is largely by mule cart, four mules pulling about a 30-cwt. load.

Roads are indifferent but not actually bad; any well built truck could operate on them to good effect.

Gasoline costs at present 48-52 cents a gallon and there is an oil company drilling here, the prospects of which are considered good. This may lead to cheap gasoline in the early future.

I should regard the population generally as being well sold on the automotive idea and passenger cars are numerous. While I personally am not in the automotive industry, I quite appreciate its possibilities and therefore send this along on the chance that you will be able to turn it to account. I shall be pleased to answer any questions from interested parties or to hand you any further information in my power.

S. ALEXANDER, Asst. Engineer,
The Barbados Electric Supply Co., Ltd.
Bridgetown, Barbados.

Wooden Wheels on B Trucks

IN the issue of AUTOMOTIVE INDUSTRIES of May 27 there was printed a report of the transcontinental trip of the Motor Transport Corps. This report included comment on the shrinkage of wood artillery type wheels with which the B type trucks were equipped. This comment aroused much interest among the wood wheel manufacturers, who plainly questioned the conclusions drawn in the article. These objections were stated in an open letter to Ralph H. Burton, the author of the article. This letter, signed by S. V. Lovenstein, chairman of the Research Engineering Division, Automotive Wood Wheel Manufacturers' Association, was printed in AUTOMOTIVE INDUSTRIES of July 8.

This letter and other communications were sent to the Motor Transport Corps office in Washington and as soon as possible to Mr. Burton, who had departed from Washington as an observer on the second transcontinental truck tour. There was considerable delay in hearing from Mr. Burton, as it was not until this tour reached Abilene, Tex., that he found opportunity to respond.

In this reply Mr. Burton states that the article was written as the result of his personal observations on the

first transcontinental trip and was not an official communication in the sense that it was approved by the chief officers of the M. T. C. He states that the publication of this report was timed to arouse interest in the second transcontinental tour. The correspondence has become quite voluminous and it will not be necessary to publish all of it. In his recent report Mr. Burton says in part:

"Army vehicles must be designed to meet all conditions. In commercial work, purchasers of vehicles may specify wheels other than wooden to meet their own particular needs, whereas the army must equip its vehicles with wheels to meet the most adverse road conditions.

"In my capacity as engineer, I have noted that more reports of wheel failure in hot, dry localities have been received from users of wooden wheeled vehicles. Any engineer understands the relative advantages and disadvantages of the different types of wheels, also that in any design it is necessary to accept compromises all the way through.

"It is my belief that, taking everything from first cost to service into consideration, wooden wheels are acceptable in commercial work provided steel wheels are specified as optional equipment, but that steel wheels should be used throughout on heavy army trucks. With steel wheels as optional equipment on commercial jobs, it would give the prospective owner who lived in certain parts of the country a chance to avoid many wheel failures due to shrinkage, improper seasoning of wood, etc."

Mr. Burton states in his communication that these tours are specially arranged for deciding solely upon equipment for army use and that the conclusions announced must be regarded from this viewpoint.

Accompanying the letter from Mr. Burton is one from the Chief of the Motor Transport Corps which says that the observations published by Mr. Burton were only Burton's personal opinions. This letter quotes similar observations of other observers on the tour from the files of the Corps' reports.

Export Trade

Editor AUTOMOTIVE INDUSTRIES:

IHAVE been interested in the work you have done through your AUTOMOTIVE INDUSTRIES, and especially EL AUTOMOVIL AMERICANO, in bringing to the attention of the automobile trade the necessity of developing and maintaining foreign outlets for their production. I think that in the present slight industrial depression the automobile industry is realizing that it made no mistake in developing foreign markets when the opportunity was good.

The American automobile is being received with such favor throughout the world that I feel that ere long these markets will be as important as the home markets, and that many factories will not only find them a great outlet for excess production, but will find it profitable to manufacture directly for the foreign demand.

O. K. DAVIS, Secretary,
National Foreign Trade Council.

Washington.

Nebraska Tractor Tests—Correction

PROF. OSCAR W. SJOGREN of the University of Nebraska calls our attention to two errors in the report of the Nebraska tractor tests in our Sept. 2 issue. In the fifth line of the second paragraph on page 460, "brake horsepower at rated speed for ten hours" should read "for two hours." In the table on page 461 it appears that the half load test is a drawbar test, whereas it is a belt test.

Common Industrial Terms Defined and Distinguished

Mr. Tipper concludes this week the definition of the most common terms used in these articles on industrial relations. He distinguishes the various types of union from one another, and defines his use of the term "socialism" as contrasted with what he calls the "proletarian movement."

By Harry Tipper

IN the discussions of industrial relations and labor matters which occur in these articles, it is necessary to consider the machinery of labor organization and indicate the terms which will be used to distinguish between the different affiliations. The craft unions which were defined under the term trade unions in the last article are gathered together in the local federated unions. Each separate craft union has its state and national machinery, and in many cases its international affiliation.

In referring to this state and other machinery of the trade union, we shall use the terms respectively: local trade union, state trade union and national trade union. Where it is necessary to refer to the consolidated machinery which represents all these trade unions affiliated together as a local matter, they will be designated local federated unions, and where it is necessary to refer to the general federation, we shall use the term national federated unions or referring to this country, The American Federation of Labor.

To distinguish between this machinery of the trade unions and the very similar machinery of the industrial unions, we shall refer to the local labor organization of this kind as the local industrial union naming the particular industry which enters into the discussion. In considering the central local body of these unions, we shall refer to the combined local industrial union.

In mentioning the national machinery, the term national combination of industrial unions will be used or in this country, the Industrial Workers of the World, the largest body of this kind. Where it is necessary to take account of other labor organizations not concerned with these two federations or combinations, we shall name the organization and then define its character so that its grouping will be understood.

These organizations are purely industrial in their machinery and their demands are made from an industrial standpoint entirely. There are a number of organizations which must be referred to occasionally in connection with these articles whose affiliations are with the worker principally and whose work is largely political, although it concerns industry and is intended to change the system of industrial movement. These organizations have been mentioned usually under the term socialism. This term, however, has been used with considerable carelessness and is not thoroughly defined; so that it is made to cover a number of different ideas and a number of different suggestions in connection with economic change through the political state.

Socialism is used in these articles only when it refers to the organizations adhering to the Marxian

creed. This creed defines socialism as the collective ownership of all means of production and distribution by the political state. It is, therefore, economic in its character, concerned with industrial operations, and its adherents are interested in all movements within the labor ranks which have a tendency to push in the direction of accomplishing their objects.

So many movements have been called socialistic which are not in any way connected with the actual socialistic development, that it is necessary to make this definition quite clear. From this socialistic movement has grown up, particularly since the second revolution in Russia, a collective movement which was named in Russia the "dictatorship of the proletariat" and which aims at the common ownership of the means of production and distribution by the manual workers.

This latter development is a limitation of the socialistic idea to control by a certain section of the population, and there is a tendency for the radical minds among the socialists to embrace this change in their definition, as the best program to be adopted.

This newer development will be called the proletarian movement, in order to distinguish it from the ordinary socialistic creed. There is an idea abroad that these movements are not particularly concerned with industry, because they attempt to develop their economic program politically, but they are intimately concerned with the change of the present system of industrial operations and there is upon many points an agreement between the practical program of these parties and the action of the trade and industrial union.

Many movements, however, which are attributed to the socialists are not socialistic at all, and should not be confounded therewith. The co-operative movement in buying and selling which has developed to a considerable extent in European countries and to some extent in this country has been associated by many people with the socialistic program. It is not, however, connected therewith, and is simply an extension of the present system of stock ownership which makes the customers the stockholders and gives the benefits which arise from ownership to the customer.

The value or the advantage of the development of socialism and the proletarian movement are not considered in this article. As I have stated at various times, I consider these movements as unlikely to provide any advantage and extremely likely to increase the difficulties under which our system is laboring.

At the proper time in these articles, the reasons for and against such economic developments will be taken up.

From time to time I have referred to employers' groups in dealing with the subject of industrial relations. Organizations have arisen in most industries comprising the companies or other forms of organization owning the establishments and employing the labor in these industries. These organizations have been named associations, societies and so forth. There is no generic term used in the general literature in connection with them, and in order to distinguish them from other groups in continuing the discussion, I have employed the term employers' groups.

This term does not signify groups which are called for the special purpose of dealing with the labor questions only, but it signifies the groups which are brought together and exist for collective action upon all important matters, labor questions being included in these lists.

No adequate discussion can be given of the tendency of events in connection with labor movements in European countries without considering the political significance. The affiliation between the trade unions, the industrial unions and the various parties consolidated under the names labor party, socialists, communists, etc., are so close, that it is impossible to estimate the political significance of the one movement in a strike without considering also the politi-

cal objects which are before the corresponding political parties and the effect which the industrial movements will have upon their political program.

The events which have taken place in Italy indicate very clearly the ease with which a strike can become a political movement for the establishment of a socialistic or proletarian program of political economics, and this condition cannot be understood thoroughly unless the affiliation, between the industrial bodies comprised of workers and the political bodies representing the worker, is fully appreciated. Wherever possible in dealing with European conditions, the names of the organizations concerned will be given as such, and then explained by applying them to the general definitions which have been indicated in these two articles. In this way it will be possible for the reader to determine the relative position of the labor party, the independent labor party, the general trade union congress, the co-operative congress and other industrial political movements in Great Britain.

For instance, I find that very few manufacturers in this country in considering events in Europe distinguish between the different organizations which represent workers politically and the relative strength which they possess in their relation to the general labor movement.

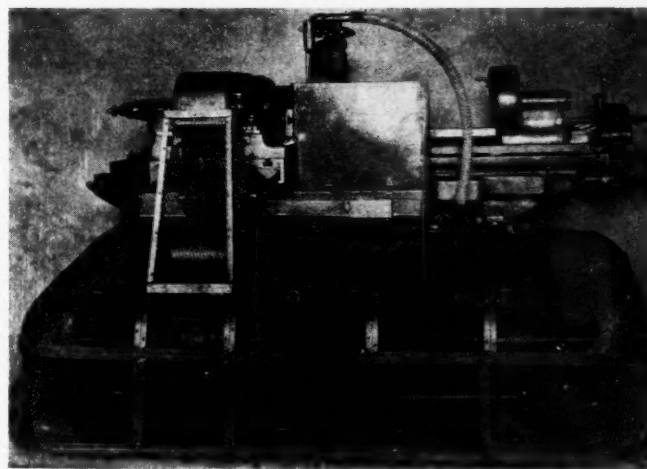
These definitions are not intended to cover the whole of the terms which may require definition in connection with the discussions. They represent some of the basic terms and those which should be understood in their limitations in order to preserve the clarity.

Phantom Guards for Grinding Machines

HERETOFORE cast iron guards have been generally used by manufacturers of grinders, but they are objectionable because of their size and weight. They are often discarded by users, resort being had to make-shift guards in order to comply with safety regulations.

A new design of phantom guard is now being fitted to the self-contained grinder of the Modern Tool Co. This consists of expanded metal riveted to an angle iron frame, a combination which gives both lightness and strength. One of the most valuable features of this new guard is said to be that it gives practically complete visibility of all moving parts which cast iron guards conceal. This not only permits all moving parts to be seen and watched, but it also acts as a check against accumulation of dirt.

THE Director of Sales of the War Department has again denied officially that he is offering for sale serviceable automobiles of any kind. The latest story was that these cars were being offered to ex-service men.



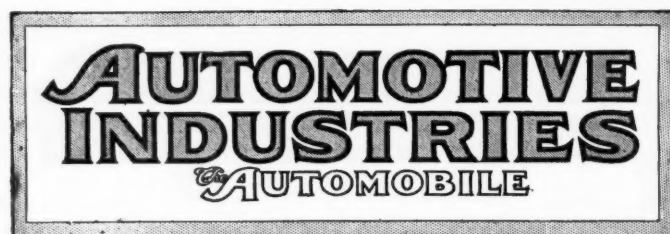
Phantom guard on grinding machine

A Cold-Starting Oil Engine

(Continued from page 659)

burnt gases then mingle with the mixture entering the cylinder and complete the vaporization of the fuel. An enlarged view of the air and oil ports is given in Fig. 8. The fuel pump and governor are illustrated in Figs. 10 to 13. The action of the governor, as the speed of the engine increases, is to raise a wedge piece which reduces the stroke of a cam-driven lever and therefore of the fuel pump. The plunger of the latter is a ground fit in the barrel in which it works, and is returned by the action of a spring. Ignition is effected by a low-tension magneto

with a contact breaker inside the cylinder. The magneto is of the tripping type, so that an equally powerful spark is obtained at all engine speeds. The smaller engines are easily started by hand, but a self-starter is fitted to the larger sizes. This is merely a hand-operated valve which lets a charge of compressed air into the cylinder from a small reservoir, which latter is recharged automatically by the engine itself. Whichever method of starting is adopted the engines seem able to get away instantly from the cold state.



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The Traffic Engineer

ONE of the important movements to-day among those who are giving intelligent consideration to the road question, is that of a traffic engineer whose duty it will be to consider the needs of traffic as related to the existing highways, also for the future of an economical traffic condition.

The traffic engineer would be named for the city, county or state, or all of these, and would function to a certain extent independent of the highway bureau as it exists to-day. It would be his job to know the conditions of all roads, to announce detours and to see that detours were over the most suitable roads. It would also be his job to announce to various transportation interests how they can route long shipments most economically. An instance in point: Motor car driveaways frequently become a serious factor in the tight traffic conditions in cities. The local traffic becomes demoralized, the driveaway caravan is delayed and some cars may be damaged in the jam. This

could easily be avoided if in that city there was a traffic engineer who would route this long train of cars through other streets than those already congested.

But as we see it, the traffic engineer could be a great force in an advisory capacity to the authorities who build the highways. It would become an incidental duty with him to plan more economical traffic by indicating where cutoffs in cities and straighter roads in rural districts would be profitable. He could show where the expense in straightening a hairpin curve would be paid with two years' gasoline consumption in going around it.

In our campaign for better highways let us not overlook for a moment that this includes straighter and more economical highways. The traffic engineer looks to be a means to that end.

Another View of Turnover

SO much emphasis has been placed upon the necessity for reducing labor turnover that the possibility has arisen of carrying the attempt too far. In a general way, of course, labor turnover should be reduced to a minimum, since hiring and breaking in new men adds extra expense to overhead charges. In particular instances, however, it may be neither politic nor just to keep the turnover percentage at the lowest possible level.

In a period of curtailed production, for instance, turnover is necessary. But only the firm which has kept careful employment department records can tell accurately how far reduction should go to attain the least expensive operation during that period and at the same time take into account the cost of again building up the force later. In some cases it may be more economical to cut working hours and maintain the force intact than to work full time and decrease the number of men employed. This will depend, of course, largely upon the status of the inventory, as well as upon the probable cost of firing men and hiring others later. Unless the employment department has kept complete cost of hiring and training records, however, the manufacturer will simply have to bear the expense of firing all the men necessary to bring production down to the level desired and then later pay again to bring it up to normal.

Assuming that times are normal, however, the manufacturer and his employment manager are under a moral obligation as regards reducing turnover that is not always recognized; this obligation has to do with the justice of keeping a man with an organization when the employer knows that the man himself will not be benefited by remaining, although the organization will gain. Every effort is usually made to keep the employee with the firm because his loss may mean a loss to the company.

Suppose a man has become very skilled on a job which is necessary to the production needs of the concern but offers no advancement either in position or remuneration to the employee. In such a case, the employment manager is not justified in urging the man to remain on that job, simply out of loyalty. To

conduct his relations with his employees on a morally sound basis, the employer must do one of two things. He must either provide within his organization the opportunity for the growth and development of his employees, mentally and physically, at their work or he must bid them Godspeed in their efforts to find opportunity elsewhere.

Granting that, in general, it is the duty and function of the employment manager to keep labor turnover at as low a point as possible, the fact must be recognized that under certain conditions he performs his task more efficiently and properly by consciously allowing that turnover to increase for the time being. In some cases this increase in turnover may be to benefit the manufacturer, in other cases to benefit the individual employee. In either case, the employment manager must be able to make his decision and perform the operation on the basis of a thorough knowledge of the actual facts of the case. Concerns whose employment managers know the cost of hiring, firing and training men in different parts of the plant should have been able to make the reductions in working force common lately in a far more intelligent and economical manner than those concerns which have had to act without the help of such correlated data.

Equipment for Snow Removal

At the present time the motor truck industry is strongly interested in the problem of snow removal. The past two years we have had unusually severe winters with heavy snowfalls, with the result that in some of the larger cities of the North practically all vehicular traffic was suspended for many days. In country districts the conditions were even worse, and in certain districts of northern New York, for instance, many truck owners took their trucks out of service at the beginning of snowfall and used horses—as far as conditions permitted.

These conditions not only result in an enormous loss to the community, but are bound to react to the disadvantage of the truck industry. Two successive winters of heavy snowfall have thoroughly aroused municipal authorities and commercial organizations to the need for preparedness to meet snow conditions.

While it might be possible to so construct vehicles that they would not be incapacitated by any ordinary snowfalls, this will hardly prove the correct solution of the problem, for the reason that heavy snowfalls and drifts would still have to be provided against. The proper solution undoubtedly consists in cutting driveways through the snow where there is only a moderate amount of traffic and removing the snow from the main thoroughfares in which there is normally a very dense traffic.

To get the snow off the main thoroughfares quickly it is evidently necessary to provide some sort of power equipment. New York City has taken the lead in this matter and has purchased a considerable number of trucks and tractors specifically for this purpose. It is somewhat doubtful, however, whether the smaller cities will be willing to invest heavily in such equipment, owing to the fact that it will be idle most of the

time. The first problem after a heavy snowfall, of course, is to cut a driveway through the snow to permit of the most essential traffic. Then comes the removal of the snow piled upon the sides of the streets. In this work it would seem the best plan to use regular motor trucks which could be hired for the purpose. The problem then would be to develop some mechanical form of loading device which could perhaps be operated from the power take-off of a truck. If this plan were adopted it would be unnecessary to have motive power equipment specially for the purpose of snow removal. The only investment would be in the loader itself and this need not be very heavy. A mechanical snow loader moved along by a motor truck and operated by that same motor truck looks like a promising solution of this phase of the snow problem.

The great difficulty as regards the mechanical handling of snow is that its physical state changes so widely. From the light and flaky condition immediately after a snow storm it often quickly changes to a wet, slushy state, and later it may become a more or less frozen mass. The ideal, of course, is to have enough equipment on hand to remove all the snow while it is still in the first condition, in which it is most easily handled. Not only this, but the more quickly the snow is removed the less the interference with traffic.

Industrial Wapin-Schaws

It is recorded that during the reign of James VII of Scotland, when the power and oppression of the Stewarts were equally strong, there were held certain games and passages-at-arms known as wapin-schaws. To these wapin-schaws all the landed gentry were expected to turn out with a full complement of men. Many of the strict Covenanters detested the wapin-schaws, but were forced to attend or incur the displeasure of the ruling party represented by the Cavaliers.

The real distaste which these folk held for the wapin-schaws, the spirit of sullenness in which they attended, and the added hatred for the Cavaliers which grew up because of this forced attendance is pictured strikingly by Walter Scott in the first part of "Old Mortality."

Years have gone by and times have changed considerably since 1679, but the student of modern industry finds what seems to be more than a trace of the spirit of the wapin-schaw in the "welfare" activities of more than one industrial plant. Picnics are too efficiently "organized"; general interest in athletics is too often "aroused"; "pep" is too definitely manufactured. The mere fact that much effort is usually necessary on the part of the welfare director to get the crowd out and make the thing a "success" is ample evidence that at least some of the wapin-schaw spirit has come down through the years.

In the seventeenth century the Cavaliers gained nothing by this method of conducting the wapin-schaw and in the twentieth century the manufacturer gains no more. There is much to be said for "letting nature take its course" when it comes to discussing "welfare" work.

Car Makers Split on Price Cuts

Many Standing Pat But Others Reduce

Condition Bordering on Chaos Follows Ford's Action—Some Makes Increased

NEW YORK, Sept. 29—After nearly a week of what has amounted almost to chaos in the automotive industry following Henry Ford's announcement of a sharp cut in prices, it is almost as difficult to forecast accurately what eventually will happen as it was the day after the Detroit manufacturer took his totally unexpected stand.

For the first two or three days after the reductions were announced, most manufacturers asserted that they could not afford to sell their products at lower prices, in view of the high cost of labor and the peak prices paid for much of their inventories. This declaration was echoed by most of the parts makers.

The first break in the ranks of manufacturers came when H. H. Franklin declared that he would follow Henry Ford's example and reduce the price of all his models several hundred dollars. The next company to make a cut was the Crow-Elkhart Motor Car Co., which went down two hundred dollars.

Then came announcements of increases by Anderson, Lexington, Pierce-Arrow and a few others. Some companies, which neither raised nor lowered their schedules, guaranteed prices for some time to come in the expressed hope of stabilizing the industry. These include Buick and Oakland, two of the General Motors string.

The next movement, and perhaps the most spectacular, was a conference of manufacturers held Tuesday at Detroit. Strangely enough the first public information that this meeting was to be held came through Wall Street sources. It was not called by the National Automobile Chamber of Commerce. At this session, which was attended by W. C. Durant, president of the General Motors Corp., and other leaders of the industry, the position was taken that prices could not be reduced under present conditions. While no official statements were made, it was intimated that practically all manufacturers would guarantee prices.

In spite of the views expressed at the Detroit meeting, however, there was a further deflection from the ranks of those

(Continued on page 689)

G. M. C. PRICES FIRM

NEW YORK, Sept. 27—W. C. Durant, president of the General Motors Corporation, has announced that his organization has no intention of reducing prices on any of its products.

"The General Motors Corp. never has favored or encouraged profiteering," he said. "On the contrary it has always given the general buying public splendid values, which is alone responsible for the enormous business enjoyed by the corporation."

Studebaker Price Cut \$125 to \$200

SOUTH BEND, IND., Sept. 28—Price reductions of \$125 to \$200 on Studebaker cars will go into effect immediately, following announcement of the cut by President A. R. Erskine, yesterday. The Studebaker action was taken practically simultaneously with a meeting of factory executives in Detroit, which was called presumably for discussion of prices.

In announcing the reduction, President Erskine said:

"Our plants have operated at capacity all year and we have unfilled orders for more than 6000 cars. Nevertheless, we believe it is highly desirable that lowering of prices be encouraged, and that we are anticipating at this time our ability to purchase materials at lower figures during the coming year, to improve labor efficiency and to increase our present volume of business. All with the effect of lowering the production cost of automobiles.

"Existing wage rates will be maintained at all plants, which at present are employing 15,000 persons. Our sales are at the rate of \$100,000,000 a year."

Stewart Slashes Prices

BUFFALO, Sept. 28 — Prices on Stewart motor trucks have undergone a wide reduction in an effort by the factory to bring about a reinstatement of pre-war conditions in its truck business. The new and old prices are:

| | New | Old |
|--------------|---------|---------|
| ¾ ton..... | \$1,295 | \$1,450 |
| 1 ton..... | 1,650 | 1,850 |
| 1½ tons..... | 1,995 | 2,450 |
| 2 tons..... | 2,495 | 3,075 |
| 2½ tons..... | 2,595 | 3,200 |
| 3½ tons..... | 3,395 | 4,100 |

In announcing the new prices the Stewart Motor Corp. said a big loss would be suffered by the factory while using up its material on hand, but "we are willing to do our part to put the business

(Continued on page 689)

Executives Convene to Discuss Situation

Paige Head Says Ford Profits Are Now on Basis of Other Plants

DETROIT, Sept. 27—After the conference of manufacturers here to-day the following statement in reference to price cuts was made by H. M. Jewett, head of the Paige-Detroit Motor Car Co.:

"It is easy to determine what prompted the action of Ford and Franklin in reducing prices. One has only to look at percentage increase tables the last two years. Ford can well afford to make a cut. He has in pocket now abnormal profits exacted from the public throughout the war period, admitting in his statement he was profiteering and the statement casting inference every other manufacturer was guilty of the same method.

"Ford prices have been a standard joke in the industry. He stopped on a profit sufficient to pay him back for money paid other stockholders whose holdings in the Ford company he purchased. He has done only what he should have done long ago. And yet the story of his price cut is spread on the front page of every newspaper along with his statement that he is prompted solely in the interest of humanity, wherein he has succeeded in fooling millions of people who know nothing of the real situation.

"Under new prices Ford is getting just what every legitimate manufacturer has been making in reasonable profit heretofore. In view of the cost of materials, labor and overhead, Ford's price increase was abnormal and in his latest announcement he simply puts his price on a basis of profit equal to the rest.

"Paige Motor Car Co. has not been profiteering. The same can be said for 90 per cent of other manufacturers. There are few others who have been making abnormal profits and their prices must come down same as Ford's. But manufacturers who have not been profiteering cannot reduce the price of cars and exist. Ninety per cent of automobile manufacturers have been making about 10 per cent profit. It is unreasonable to presume they could cut prices, and reduction now or in the near future is absolutely impossible."

Charles D. Hastings, president of the Hupp, said that no action was taken at the meeting either for or against price cuts, and added consensus was that price reductions were out of question. "As for Hupp Motor Car Corp.," said Hastings

(Continued on page 689)

Ford and Franklin Sales Speed Up

Respond Speedily to Price Reductions

Surveys in Trade Centers Show Immediate Effect Upon Pros- pective Purchasers

Careful surveys of the effects of price reductions on sales of Ford and Franklin cars have been made by correspondents of Automotive Industries in the leading distribution centers of the country. They disclose a very large increase in the sales of these cars. Following are conditions found in some of the larger cities:

Philadelphia.—C. G. Heck, president of the Franklin Motor Car Co. of Philadelphia, says that since prices were reduced many persons who had planned to buy used cars have switched to the purchase of new ones. Business has been good for the last few weeks, however, and it is too early to indicate the percentage of increase. Reports from road men as to the results of price cuts are optimistic. The Ford Motor Co. headquarters here says the price cut has already had a tremendous effect in increasing actual sales, but it will be impossible to determine the actual percentage before the end of the month.

Cincinnati.—Sales of Ford cars in Cincinnati have increased 75 per cent as a direct result of the price cut, according to the eleven recognized Ford dealers here. The Franklin cut has not been in effect long enough to show an increase in actual sales, it is said, but inquiries have been numerous.

St. Louis.—Announcement of the Ford price cut has caused a "wonderful stimulation of demand" in St. Louis, according to dealers. Most of them report increases ranging from 50 to 75 per cent and a few as high as 100 per cent.

Minneapolis.—Minneapolis Ford dealers report increase sales ranging from 50 per cent to 400 per cent for the first four days following the price cut with about the same percentage obtaining in reports from various cities throughout the State. Indications point to at least 60 per cent increase for the entire Fall season. There has been a pronounced increase in inquiries regarding the Franklin car during the short period the cut has been in effect. Franklin enters the Minneapolis enclosed car show next week with a decided advantage and indications of heavy sales.

Omaha.—The immediate effect of price reductions on Ford and Franklin automobiles is declared by Omaha distributors and dealers to have been a prompt and vigorous demand among prospects. Byron W. Hart, one of the Ford dis-

(Continued on page 687)

PRICE CUTS TO FOLLOW LOWER CAR OUTPUT

NEW YORK, Sept. 27—The following telegram from W. H. Beal, general sales manager of the Lycoming Motors Corp., Williamsport, Pa., was received to-day by AUTOMOTIVE INDUSTRIES in response to an inquiry as to whether parts manufacturers believe it would be possible to make the reductions in prices predicted by Henry Ford and H. H. Franklin:

"Lower material prices will undoubtedly follow decrease in automobile production. I do not believe that price reduction is based on lower material cost but to turn large unbalanced inventories preparatory to lower material prices for future production."

Inventories Hold Up General Price Cuts

SYRACUSE, N. Y., Sept. 27—Manufacturers in this city of automobile parts were reluctant to-day to make any statement concerning the practicability of reducing the price of materials which go into the manufacture of cars. This was the assumption on which the Franklin and Fords cuts were based.

Producers of parts going into Franklin cars refused to make statements, asserting that they have had no opportunity to make estimates since the cut was announced.

Aside from producers of Franklin parts, the manufacturers intimated that there could be no more price cutting by manufacturers until present stocks of high-priced materials had been worked up. The Durston Gear Co. which makes parts for several cars selling from \$1,500 to \$2,000, made this statement:

"There is every reason to believe the price of cars in this general class will be stabilized for some time to come. The manufacturers are not making abnormal profits and their cars are being sold at a price entirely in accord with the actual cost of production. Until materials bought at the peak last spring are moved there is no chance of a general revision downward. In fact, some makers are finding it necessary to increase prices."

CROW REDUCES PRICES

ELKHART, IND., Sept. 27—The Crow-Elkhart Motor Corp. announces that it has cut prices \$200 on all its models except the sedan, effective Sept. 24. The four-cylinder touring car and the roadster have been reduced to \$1,295; the six-cylinder to \$1,545 with a Herschell-Spillman motor.

Makers of Steel Move Cautiously

Regard Price Trend in Future as Largely Psychological—Attitude of Independents

By WILLIAM CRAWFORD HIRSCH

NEW YORK, Sept. 27—In keeping with the tripartite organism of the steel industry which is made up by (1) the United States Steel Corporation, (2) the large "independents," and (3) the smaller mills, its answer to the price reductions announced by a few makers of popular priced passenger automobiles must needs be triangular because of the different effect of these price cuts on the three classes of steel industry factors. Before setting forth how these announcements reacted on steel makers, it may be well to point out that, inasmuch as sentiment in the matter of the price trend of the future is largely a psychological problem, the rank and file of steel makers are disposed to resent anything and everything that savors of the spectacular in making known price changes, either up or down. Price advances to them are expressive of a lack of supply with a surplus of demand and price reductions of the inverse condition. They have utterly no use for propaganda ribbons tied to price changes for the purpose of influencing public opinion. It will, therefore, be understood why in many quarters of the steel industry an undercurrent of sarcasm was encountered in answer to the problem of the probable effect of the reductions in the price of certain passenger cars on steel prices. Replies obtained are here summarized in the three classes heretofore alluded to.

Steel Cut in March, 1919

(1) The United States Steel Corporation subsidiaries have a right to consider the reductions made in the price of certain passenger cars as an answer to the reductions which the corporation made in the price of steel and steel products on March 21, 1919. Officials of the steel corporation have solid ground under their feet when, in answer to the statement attributed by the press to Henry Ford, they bring forth from their archives a statement issued on March 21, 1919, by the Industrial Bureau of the Department of Commerce which contained the following:

"The board is asking industry to co-operate in taking the first step and voluntarily make temporary sacrifices in the interests of all and has asked the iron and steel industry, because of its fundamental importance, to be first to act, and the board is highly gratified

(Continued on page 690)

Credit Given to Ford by Franklin

Thinks Price Cuts Will Bring Trade

Hopes to Avert Unemployment —Expects Material Costs to Go Down

SYRACUSE, Sept. 27—"The only way to effect a readjustment of the automobile business which will lead to a resumption of selling is to readjust completely," was the assertion of H. H. Franklin, president of the Franklin Automobile Co., in announcing a radical price reduction on all Franklin models at a luncheon at which all New York State dealers in Franklin cars were the guests.

Prices announced for current models, of which the Franklin company has hundreds on hand, show reductions of from 17½ to 21 per cent. The factory has been working on a greatly reduced production basis for several weeks past and it was unofficially announced that the fact that 2400 employees were without work was one of the motives actuating the price change.

Franklin gave credit to Henry Ford for having started the revolutionary methods. Franklin, however, was the first of the manufacturers of higher priced cars to make the change.

Franklin expects the reduced prices to reopen the selling markets, and that it will be only a matter of a few weeks before the Franklin plants, which are in the midst of expansion, will be operating on the same basis existing before the recent period of depression.

There was no announcement of what protection would be given dealers with Franklin cars on hand.

Seek Contract Readjustments

Franklin's statement follows:

"The way to readjust is to readjust," said Franklin in making the announcement of the sweeping reduction. "Lower prices have got to come, and the way to get them is to inaugurate them at once. We shall suffer loss on large stocks of materials purchased at prevailing high prices, but we shall endeavor to obtain readjustments of existing contracts to meet the new conditions and to place new contracts at figures below what we have been paying.

"I believe the loss to us and to the dealers will be but temporary and that the ensuing activity will result in a restoration of nearly normal conditions of employment, increased production and accelerated demand for our products. Our unfilled orders amount to about one month's production.

"There is more unemployment in this country than is generally known, and

the way to continued success is to keep all labor constantly at work. We will make no change in our wage scales. We have laid off about 2400 men since early July and reduced our output from 55 cars a day, the maximum reached in June, to 16 cars a day for five days a week.

"We hope under this new arrangement to restore conditions gradually to normal until the force of 5000 persons employed in the early summer is again attained."

The new and old prices of Franklin cars are:

| | Now | Formerly |
|----------------------|---------|----------|
| Sedan | \$3,600 | \$4,350 |
| Brougham | 3,500 | 4,300 |
| Touring | 2,600 | 3,100 |
| Four-passenger | 2,500 | 3,050 |
| Two-passenger: | | |
| Roadster | 2,400 | 3,050 |
| Enclosed | 2,750 | 3,300 |

Labor and Material Keeping Up Prices

CHICAGO, Sept. 27—None of the motor car manufacturers in the Chicago territory is willing to admit that price cuts by Ford and Franklin will be followed by general reductions in the price of automobiles. This statement was made by the Moon Motor Car Co.:

"Moon contemplates no price reduction, especially since no reduction can be effected in labor and none in steel, which is the principal makeup of the automobile, and coming at the same time with the curtailed production necessarily means an increase in overhead. Ford's cut in price is not a criterion for cars in the Moon class, and do not believe will have any effect except to emphasize the point that since the war Ford prices have increased to a much greater extent than the average make of car, notwithstanding the fact he was making a standard product."

H. J. Lenard, general manager of the Stephens Motor Works of the Moline Plow Company, said:

"This company does not contemplate price lowering. Our prices are based very conservatively on material and labor rates, and we do not consider it the duty of large manufacturers to absorb large losses. Prices should come down in a more orderly manner, beginning with materials. We consider Ford's action a *tour de force* which will result in great stagnation in all business."

The Mitchell Motors Co. said:

"Mitchell prices are not inflated and we do not expect to make reductions."

Representatives of the Elgin Motor Car Corp., Argo, Ill., said there would be no cut in the prices of Elgin cars. They asserted that contracts entered into for materials would make a reduction impossible.

Reduction in Steel Six Months Distant

Independent Companies Say Situation Hinges on Pig Iron— No Unshipped Tonnage

YOUNGSTOWN, OHIO, Sept. 27—J. H. Fitch, Jr., of the Newton Steel Co., asserted to-day that no price reductions in sheets for automobile manufacturers seemed possible under six months, although the prices of his company and other finishers depend entirely on the price of bars. He added that the Ford company was clamoring for the Newton company to rush forward all the sheets possible, but that the H. H. Franklin Mfg. Co. had given instructions that shipments of sheets were to be held up.

The big independent companies say the entire steel situation hinges on pig iron. No one has a large stock of pig and little is being made. As a consequence pig iron producers are fixing their own price. This situation does not affect the United States Steel Corp. in such large measure, although local United States Steel connections say the big groups cannot produce pig for much below the present prices.

Leaders of the steel industry in the Mahoning and Shenango valleys have been asked frequently in the past fortnight about future prices, and it is known several conferences have been held, but they did not produce any definite indication of what the future will bring.

There is no unshipped tonnage of automobile sheets in the Mahoning valley but some frames and stampings have not been shipped.

CANADIAN FORD DROPS

WINDSOR, ONTARIO, Sept. 29—Price reductions by the Ford Motor Co. of Canada, proportionate to those announced by Henry Ford for the company in the United States, were announced by Gordon McGregor, president of the Canadian company. McGregor said there would be no reduction in the wages of the Canadian company's 4500 employees. He added that his company expected to produce 60,000 cars this year, and that it had sufficient raw material on hand to last until next spring.

RECEIVER NAMED FOR ACE

PHILADELPHIA, Sept. 28—Unable to operate because it lacks sufficient cash to meet maturing obligations, according to creditors, the Ace Motor Corp. was placed in the hands of a receiver to-day. According to a bill in equity, the assets are \$2,000,000 and liabilities \$1,300,000.

Lower Prices Dissipate Lethargy

Ford and Franklin Dealers Delighted

Prospects Keep Them Busy After Manufacturers Announce Reductions

(Continued from page 685)

tributers, says that prospects responded to the announcement of price reductions by a flood of calls, largely by telephone. In many cases they were diffident about revealing their identity and also were not inclined to commit themselves, but he regards the number of inquiries as significant. He adds that if he could get the cars his volume of business would be probably double this fall. H. Pelton, Franklin dealer, says the demand has been highly stimulated by the price cut and that his firm has virtually closed within two days a number of sales which previously had been held up. He predicts a re-establishment of the trade upon a healthier basis than has prevailed for the last two years.

Buffalo.—George Ostendorf, president of the company which is the agent for Franklin in this city and Buffalo territory, says the reduction in prices will triple his business. Announcement of the cuts already has greatly increased sales, especially in sedans and other enclosed models which are most in demand at this season. At the headquarters here of the Ford Motor Co., it was declared that the price reductions had resulted in so large an increase in orders that many buyers will have to wait some time for delivery.

Portland, Ore.—Price reductions on Ford and Franklin cars already have more than doubled business in those lines. Stephen A. Stellwagen, manager of the Portland Ford branch, says that actual sales of Fords have increased between 100 and 200 per cent. One dealer alone sold seven cars Friday and five Saturday where sales previously had been very slow. The reduction has had the effect of causing the outside territory to assume more life than at any time since the gasoline shortage began last May. The Franklin distributor has received more inquiries from bona fide prospects in two days than in the previous month. The effect on other lines has been bad, however. All dealers report sales have ceased for the time being while prospects wait to see what will happen. Used cars are at a standstill.

Atlanta.—Ford and Franklin price reductions have had an immediate and serious effect on business here. Some dealers already report cancellation of retail orders and one dealer reported cancellation of a large wholesale order.

30 DAYS' PROTECTION

DETROIT, Sept. 27.—In connection with the price cuts made by the Ford Motor Co. it is stated that the corporation will protect dealers on all cars shipped within 30 days prior to the announcement of the new price schedule. The Fords take the position that no dealer should have cars in stock more than 30 days.

Dealers were very pessimistic at a meeting yesterday and believe people now will hold off buying more than ever, thinking a general price reduction is coming. Dealers are sitting tight and awaiting developments, but they believe Ford and Franklin cuts will seriously upset sales for several weeks. Ford dealers report a considerable stimulus in sales. Franklin dealers report a stimulation of interest, but say it is too early to give any percentage of actual increase in sales.

New Orleans.—The reduction in price of Ford cars, including trucks and tractors, will force down the prices of other cars of competitive size and price throughout the South, in the opinion of F. C. Bowman, president of the Universal Motor Company, leading distributors of Ford cars in New Orleans. "The cut in prices will stimulate business among Ford dealers in the South as nothing ever has done before," said Bowman. "This section is far behind on deliveries on orders for Fords and the men who planned to buy, or have ordered cars which have not yet been delivered, on credit terms, can now buy for cash and save all the way from 30 to 50 per cent. We will add ten salesmen to the force, and double the capacity of the service department. Now is the time to get cars in the South, owing to the cold weather coming on in the North, and, while we are far behind on deliveries here to-day, we expect to catch up, or nearly so, during the snow and ice period in the North."

Milwaukee.—A sort of sales vacuum was created by the Ford announcement of price reductions which came with a bewildering swiftness to influence the public mind, already considerably upset. Everyone asked the question, What are the other fellows going to do? And assuming a self-answering attitude, the public believes the other fellows will do like Ford, eventually, if not immediately. The consequence is that the great majority of prospective buyers are waiting, with the result that the calm in retail sales is more conspicuous than ever.

(Continued on page 691)

Reductions Bring Business Revival

Metropolitan Ford and Franklin Dealers Report Brisk Trade Following Announcement of Cut

NEW YORK, Sept. 27.—Ford and Franklin dealers in the metropolitan territory have had a decided increase in business since the announcement of price reductions. The Ford New York branch reported all its dealers selling heavily on all lines and taking orders for deliveries several weeks distant. Franklin had a rush of inquiries at the salesroom and over the telephone and a large number of sales. Dealers in other makes of cars, whose salesrooms had just begun to take on life following a two months' period of extreme dullness, began to feel the effects of the reductions within two or three days of their announcement.

Refusal to buy because of price, which had been a minor factor in sales resistance, became the burden of many prospects' arguments and sales were slowed up. Dealers whose manufacturers announced decisions to maintain prices began to plan campaigns to sell on the basis of value and stable prices.

New York distributors of two cars only a little above the Ford class in price noticed no slump in retail demand the first three days following the Ford announcement, though messages from their dealers out in the territory indicated an attitude of discouragement on the part of the small city and rural men in the face of the wide publicity given the Ford announcement.

Make Sales Despite Prices

One dealer reported an interesting experience with a car in the \$1,400 class. Two days after the Ford announcement and the day following the Franklin reduction a prospect who was about to close telephoned in a cancellation of his appointment with a salesman. The prospect said he wouldn't buy "until the price came down." Ignoring the message, the salesman made his call according to the original agreement and sold the car.

A New York dealer in a \$1,200 car had his largest day of sales since June three days after the Ford reduction.

Several New York distributors, who are keen students of sales conditions, expect a decided slowing up of sales in lines where reductions are not made—for a brief period. They point to what happened last spring, when Wanamaker lopped 20 per cent off practically all his retail prices. One or two New York

(Continued on next page)

Tires Not to Cost Car Makers More

Goodyear Rates Not Going Up Oct. 1

Other Companies Reticent—Ford and His Staff Confer With Firestone

AKRON, Sept. 27—The leading tire companies of Akron, which means of the world, would not admit to-day that any price reductions were contemplated. They intimated on the contrary, that increases were more likely. The publicity department of the Goodyear company said that an advance of 10 per cent would be made to car manufacturers only on Oct. 1. This plan has been abandoned, however, because of the storm of protests.

The Miller Rubber Co. asserted that production costs were rising and that no change either way was expected before Jan. 1.

Goodrich declared expectations of price cuts were an assumption on the part of dealers.

At the office of Harvey S. Firestone it was said there was no public announcement to make at present, but that no change in prices was anticipated.

Henry Ford, accompanied by his son Edsell, and members of the Ford plant administration staff, visited the Firestone plant here last week, and then went on to the big steel works at Canton, Youngstown and Pittsburgh.

The visit of the Fords is regarded as a forerunner of more business for the local tire industry, following so closely upon the announcement from Detroit that the price of Fords had been dropped to or near pre-war prices. Ford conferred with H. S. Firestone, but would not grant any interviews dealing with the nature of his trip here, but rubber circles believe a resumption of business is not far off. Firestone would not deny Ford would take over the plant.

Bottom of Slump Reached

The Firestone plant furnishes the major portion of the tires fitted to the Ford cars at Detroit before shipment. If Ford came here to discuss the reported advance of 10 per cent in the price of tires to automobile manufacturers the Firestone officials professed ignorance and stated that no notice of a rise in the price of Firestone tires to car builders had been given.

It was learned at the Firestone that Ford said his plant would put out 900,000 cars in 1920, and he has previously been quoted in connection with his cutting of prices as saying the 1921 output would be at least 1,250,000 cars. Firestone officials say this will mean orders for at least 1,000,000 tires from Akron.

The bottom has been reached in the slump here, according to Firestone officials, but while a small return of unemployed is noticed the company does not expect to begin taking back workers in large numbers for a few weeks yet. The local manufacturers profess to be more optimistic and are hearing of a steady movement of surplus stocks of tires from the ware rooms of dealers throughout the country.

N. A. C. C. Not Informed of Possible Changes

NEW YORK, Sept. 27—A telegram stating that the National Automobile Chamber of Commerce has nothing whatever to do with establishing prices has been sent by Alfred Reeves, general manager, in response to a message from the Chicago Automobile Trade Association asking for a statement either affirming or denying reports that a general cut in prices was contemplated by the automotive industries. He explained that the formulation of prices is a matter for individual action by the manufacturers.

Information obtained by the N. A. C. C. indicates that the general feeling in the industry is that the action taken by Ford and Franklin is purely individual with them. It is assumed they may have found reductions necessary. Other manufacturers assert they must base their prices on demand, prices of raw materials and parts, labor costs, etc. A survey of the parts manufacturing fields, Reeves said, discloses no disposition to lower prices because of the high cost of raw material and labor.

The position of the N. A. C. C. is that its members should not be stampeded into price reductions, but should consider the situation carefully from all its angles before reaching a decision. Every effort is being made by Reeves and his associates to stabilize the industry.

USED CAR PRICES DROP

LONDON, Sept. 10 (*Special Correspondence*)—Reports of London and provincial sales of second-hand cars, motorcycles and trucks, especially of the larger sort, indicate a remarkable fall in price. The average drop seems to be in the neighborhood of 30 per cent, but runs to 50 per cent in the case of motorcycles and certain makes of cars. A leading London motor auctioneer who has disposed of many thousands of Government vehicles of all sorts, regards this result as due to the tailing of the season's demand, increased production, and also as the anticipated result of the new gasoline price increase and the taxation of \$5 per hp. which is to begin with the new year. He anticipates also a wholesale fall of new car prices.

Cuts Impossible Is Indianapolis View

Makers of Higher Priced Cars Declare Raises Contemplated —Buying Slower

INDIANAPOLIS, Sept. 24—Ford and Franklin price reductions practically have killed retail sales here for the time being. The trading values of Fords have been entirely upset as is the market for second-hand machines. It is too early yet to determine the ultimate effect of these reductions on the buying public, but for the present at least prospective buyers have adopted a policy of watchful waiting and are hoping for reductions in other cars.

The reductions took local dealers wholly by surprise and they have not adapted themselves to new conditions. Local factories deny that they have any intention of cutting prices. William N. Thompson, president of the Stutz company, says reduction is entirely out of the question and they are contemplating a raise in price. Stutz is working more men than they were thirty days ago and intend to take on more after Oct. 1. General Manager Schmidt of National says his plant is gradually hiring back old employees and announces that National prices have been guaranteed until July 1, 1921.

Harry Stutz of H. C. S. said: "There can be absolutely no change in price before July 1, if then. We have never taken advantage of our customers and have nothing to return to them."

Marmon officials refuse to talk on the labor situation. Walter Marmon said that they are not considering price cutting but price raising.

Lower Price Brings Revival of Business

(Continued from preceding page)

stores followed suit and there was a flurry in several Middle Western cities. Then the story disappeared from the front pages of the newspapers and the stores that reduced and those that didn't went on doing business on just about the same basis as before the excitement. The public bought what it wanted where it wanted to buy—and some of the metropolitan distributors and their sales managers expect the same thing to happen in the automobile field.

The chief problem for dealers in cars whose prices are maintained will be to convince prospects that there will be no reduction on these cars. For this reason guarantees are expected.

Officials Seeking Return to Normal

Many Standing Pat But Others Reduce

Studebaker, Overland and Hudson-Essex Lead in Medium Price Car Changes

(Continued from page 684)

determined to stand pat. Roy D. Chapin, president of the Hudson-Essex Company, who attended the conference, announced a few hours afterwards that the prices of his company's models would be reduced from \$200 to \$450.

"We are in business to sell automobiles," he said. "No action could be taken at the meeting yesterday binding manufacturers. It simply was an informal conference. People have been looking for cheaper prices on everything and when Willys-Overland and Studebaker cut prices to-day, we decided, in view of the downward movement, that the Hudson and Essex companies would do what they could to help in restoring normal conditions."

The Studebaker cut, announced by President Erskine, range from \$125 to \$200. Almost simultaneously came the announcement by John N. Willys, who returned only last week from a trip to Europe, where he studied the export markets, that a substantial reduction would be made in the Overland and Willys-Knight cars.

"We could not possibly have taken this action," Willys said, "unless we felt thoroughly justified in anticipating reduced cost of materials, against which our companies have made provision. It has been commented that the automobile business has been profiteering. The profit in proportion to the increase in prices has been much less in this industry than prior to the war."

"After two months of personal investigation of conditions abroad, I am firmly of the opinion that this country cannot hope to develop healthy business and to compete with foreign markets, unless we establish merchandise selling prices more nearly on a par with conditions prior to the war."

While the Republic Truck Company, controlled by Willys, was guaranteeing prices until next June, the Stewart Motor Corp. announced a substantial cut in the prices of all sizes of its trucks. In announcing the reductions the statement was made by T. R. Lippard, president of the Stewart, that the action was taken primarily to assist dealers at

a time when the public is convinced that lower prices are coming and will not buy until they are made. The company will absorb the losses on present inventories.

Surveys made throughout the country by correspondents of AUTOMOTIVE INDUSTRIES disclose that the effect of price reductions has been an immediate stimulation of business with a marked increase in actual sales. The business in other lines, on the other hand, is virtually at a standstill. The attitude of the buying public is that it will wait to see what will happen, in the expectation that price reductions will be made by all companies.

(Continued on page 696)

Studebaker Price Cut Ranges \$125 to \$200

(Continued from page 684)

of the country on a pre-war basis immediately, thus insuring continued prosperity and full employment to labor."

Bell Car Drops \$100

YORK, PA., Sept. 28—Bell Motor Car Co. has reduced the price of its product, the Bell car, from \$1,595 to \$1,495, to take effect at once.

Pierce-Arrow Adds \$250

BUFFALO, Sept. 28—Increases in passenger car prices were announced to-day by the Pierce-Arrow Motor Car Co., the average being about \$250 a car. Col. Charles Clifton, chairman of the board, said: "There has been no reduction in production costs." Under the new schedule Pierce-Arrow touring cars will cost from \$7,500 to \$8,000.

Autocar Includes War Tax

ARDMORE, PA., Sept. 28—The Autocar Co. will not increase prices, but on and after Nov. 15 will charge customers for war excise tax which hitherto has been absorbed by the manufacturer in the factory price.

Paige Drops All Prices

DETROIT, Sept. 29—New prices were announced to-day on all Paige-Detroit models. There are eight of these models. They are all new from stem to stern, and have just been announced. The prices follow:

| | Old | New |
|---------------------------|---------|---------|
| Lenox small roadster..... | \$1,925 | \$1,770 |
| Small coupe..... | 2,775 | 2,525 |
| 5-passenger sedan..... | 2,875 | 2,645 |
| 5-passenger touring..... | 1,925 | 1,770 |
| 4-passenger sport..... | 2,165 | 1,990 |
| 7-passenger touring..... | 2,995 | 2,795 |
| "Larchmont Second"..... | 3,095 | 2,895 |
| 7-passenger sedan..... | 3,995 | 3,750 |

Executives Convene to Discuss Situation

Price Guarantees Expected Where Reductions Are Not Made— First Joint Meeting

(Continued from page 684)

ings, "our trouble has been only one of producing enough cars to fill demand. If we cannot make money we will close up shop, and we cannot make money if we reduce the present price of our product."

G. H. Layng, vice-president of the Cadillac, said that Cadillac was not represented at the meeting for the reason that price reduction was impossible and could see no necessity for discussing it. He said Cadillac's only worry was producing cars sufficient for demand.

Roy D. Chapin, president of Hudson; Alvan Macauley, president of Packard; Percy Owen, president of Liberty; J. G. Bayerline, president of Columbia; F. J. Haynes, vice-president and general manager of Dodge Bros., each declined to make any statement, other than that it was an informal discussion of conditions in "Get Together" meeting of the manufacturers. None admitted any significance in the fact that it is the first "Get Together" meeting of automobile manufacturers so recorded. C. A. Pfeffer, president of the Saxon, said he did not attend meeting, and declared Saxon was guaranteeing price to distributor and consumer until April 1.

Reports persisted after the meeting that price guarantees from practically all manufacturers would come as a result. None, however, would admit such action was taken or contemplated. The statement of Hastings, Layng and Jewett, coupled with that of Pfeffer, indicates that the plan likely will be put in effect.

Before the manufacturers' meeting was called, and soon after the cuts by Franklin and Ford, these statements were made by representatives of automobile makers:

W. L. Daly, sales manager Columbia Motors Co., said:

"It will be hard to say just what effect Ford and Franklin announcements will have for a couple of weeks. Opinion general reduction on all cars will be compelled by public attitude in delaying buying. It will take some time, however, to determine real effect on public attitude. As far as Columbia is concerned no decrease is contemplated in the near future."

Percy Owen, president Liberty Motor Car Co., said:

(Continued on next page)

Makers of Steel Move Cautiously

Gary Says Car Makers Are Only
Answering New Steel Cut
of March, 1919

(Continued from page 685)

with the spirit in which it has responded. "It is fully understood and expected that the present wage rate or agreement will not be interfered with, the approved prices having this in view.

"The reduction in the price lists may involve the necessity of some high cost plants either shutting down temporarily or running at a loss for a period, but it is expected that with an increased volume of business soon to be developed a reasonable return to the average and the better than average producers will be afforded."

The price levels then fixed have been adhered to by the corporation. Coming on the heels of the announcement of the reduction in the price of certain passenger cars, the American Steel & Wire Co. advanced its base price on cold rolled strip steel \$12 a ton. This may have been purely a coincidence but the effect of this advance on the smaller steel makers, who might have become overpliant in their price views as the result of the cut in these passenger cars was not lost. Anyway, Judge Gary's answer to Mr. Ford might well be: "Answer, it was Mr. Ford who did the answering. I spoke on March 21, 1919, when the corporation assented to the Industrial Board's price schedule which has been maintained ever since."

(2) The large independent steel producers were engaged in the task of putting their house in order, i.e., adopting the steel corporation's prices as their own, when the announcement of the lower passenger car prices was made. The pruning process to which they were subjecting values, was neither accelerated nor retarded by this news. They have, for the most part, orders on their books to keep their mills going over the remainder of the year and the products of whatever equipment is first likely to show idleness will come in for correspondingly increased pushing by the sales departments, an activity that involves per se concessions to buyers.

Blame Buyers for Prices

Sales departments of independent steel producers, by the way, want it emphatically understood that the blame for the higher prices which many automotive consumers paid early this year, rests solely on the shoulders of the buyers who flaunted offers of absurd premiums in the face of any one who had or could get them steel. While the total tonnage of steel absorbed by the automotive industries is only 7 to 8 per cent of the entire steel output, it forms in the case of some independent mills a considerably greater part of their individual production. These are confident that the gradual return of steel prices to normal will

be accompanied by a corresponding readjustment in the prices of raw materials and fuel which they have to buy and that tonnage consumption will after all remain satisfactory. These independent mills, moreover, are nearly all encumbered with high price pig, etc., only to the extent of firm orders on their books.

(3) The smaller mills that have been catering to automotive trade, because it afforded the greatest possible returns, are admittedly nervous over the outlook. For the time being, much steel is going out of their plants on account of old orders, but orders on their books are becoming fewer and fewer. In many cases they have considerable accumulations of high priced raw or semi-finished material on their hands. Heretofore buyers have sought them out and bid for material. Now it looks as though they would be compelled to solicit trade and offer concessions to win it. But of this change in the order of things they were fully aware before the announcement of the reduction in the price of certain passenger cars. This only served to accentuate their uneasiness.

Broker Steel Price Factor

Such is the situation in the three camps of the steel industry. There is a fourth factor that has been affected by the price cut announcement, but he is not a producer. He is the broker and speculator in odd lots of steel. Automobile sheets were his pet stalking horse a few months ago, when it was nothing unusual for him to clean up profits of \$100 on each ton of automobile stock handled. For him, Mr. Ford's price reduction announcement was a funeral dirge, but his business had been ailing for many weeks before. For the small and larger independent manufacturers it was the tocsin that automobile buyers would hereafter consider as the steel market the prices of the United States Steel Corporation, the officials of this, the largest interest, interpreting the passenger car price reductions as the fruit of the seed which they had sown on March 21, 1919.

Steel Mills Report Labor Much Improved

YOUNGSTOWN, Sept. 28—Steady increase in the efficiency of labor throughout the industrial life of the Mahoning and Shenango valleys, is reported by industrial leaders. Some plants are operating with 20 per cent fewer men than they were during the war, and have now reached a state of pre-war production that is recorded with much satisfaction. Great numbers of foreign born workers left the steel plants and the valley last winter during the steel strike. The most of these returned to European homes. Their places were filled with rubber workers from Akron. In the last few months many of those who went to Europe in high hopes have been returning to Youngstown and seeking their places in the mills. Those that have been given their places have shown a decidedly new interest and zip in their work.

Executives Convene to Discuss Situation

Admit Labor Efficiency But Say
This Is Only Small Part of
Car Make-up

(Continued from preceding page)

"We have no information at this time warranting a decrease in car prices. And certainly there will be no decrease on cars fairly priced and worth all the manufacturer asks for them. While labor efficiency has increased greatly within the last few months, labor is a comparatively small part going into the manufacture of automobiles. We all hope to make savings but there is nothing to indicate decrease in parts and materials that enter into automobile manufacture. On the other hand, a manufacturer told me to-day the cost of frames would be \$5 more per frame and I understand 10 per cent raise in tire cost is effective Oct. 1."

G. R. Bury, general distribution manager Packard, said:

"There will be slowing up in demand for the time being as a result of Ford announcement but public soon will realize there is nothing in it and business will return to normal. When buying public learns automobile manufacturers have not been profiteering except in isolated instances but on the other hand have been making only fair and reasonable profit, they will realize the absurdity of the statements that have been made."

D. E. Bates, secretary-treasurer of Reo Motor Car Co., declared there is nothing in the present situation to warrant such a price cut as that announced by Ford. He declared manufacturers were not working on a large margin of profit and cited tires as having advanced in price 10 per cent Oct. 1, in support of his statement that there is no justification for a price reduction at this time.

Dort Can't Cut Price

President J. D. Dort of Dort Motor Car Co. said: "The price of the Dort car is reasonable and fair, therefore there will be no price reduction made by this company. There has not been as yet a break in material or labor costs that would warrant any price reduction on the Dort car. On the contrary the material purchased by us and other motor car manufacturers for 1921 production has been at a considerable advance as a whole over the 1920 price.

"Unless those purchase contracts are treated by purchasers as scraps of paper, or the seller voluntarily revises contract prices downward, there can be no justification for any motor car manufacturer to reduce prices unless he has been profiteering, which means he has been receiving an excessive profit on his product. If there be any such manufacturers, this is a most opportune time for them to properly adjust prices to the sound value of their product."

Ford and Franklin Sales Leap Ahead

Expect Announcements From All
Factories Whether Prices Are
Reduced or Not

(Continued from page 687)

While dealers have been making strenuous efforts to move used cars for several weeks, they are going at this matter more vigorously in order to gain the benefit represented by existing prices and avoid too great a sacrifice which may be demanded as the result of the Ford announcement.

San Francisco.—As the week ends and more announcements are received by the various distributors from their factories, the local automobile "row" is becoming more and more excited over recent developments. Franklin distributors and dealers report a marked increase in business following announcement of the Franklin price cut. Ford dealers are doing a big business. Distributors whose factories have announced guarantees for present prices claim they are already recovering from the temporary lull which resulted from the first drop-in-price announcement. Dealers whose factories have made no announcement are the hardest hit by the present watchful-waiting attitude of the motor car purchasing public. The used car market has been badly hit as a result of the week's happenings.

Memphis, Tenn.—Ford dealers here are delighted with the decrease in prices and predict very heavy sales as a result. Contrary to opinion, all dealers are well protected by the Ford company for any amount of over-stock they are carrying. Prices for parts have not yet undergone a decrease.

Hartford, Conn.—The Ford price reduction caused quite a stir in local motor car circles and instantly gave rise to the rumor that prices on all cars would drop presently. As a result of this some of the dealers have had a very lively time endeavoring to convince their prospects that no such thing would happen. In fact, some of them were able to show letters from their factories setting forth the situation very clearly. Good use has been made of these letters. Shortly after this came announcement of the Franklin reduction. The net result is a rather ruffled state of affairs, with prospective buyers sitting back waiting for something else to happen.

Pittsburgh.—Sudden price denouement on the part of Ford and Franklin has slowed up materially the demand for cars. Buyers naturally are looking for price reductions by other manufacturers, and as a result are holding off placing orders at this time. Local Franklin dealer reports an increased demand, which, by the way, was to be expected. It will take the buyer some time to catch his breath; until he does the local distributor is going to feel the pinch.

PROHIBIT BOSCH

LONDON, Sept. 11—The High Commissioner for Australia has notified the British Board of Trade that the Australian Government has prohibited the importation into that country of magnetos that bear the word "Bosch." Warning is given that car manufacturers must not offer for import cars of which magnetos bearing this word are a part. The ownership of the factory making the magneto is no defense.

CHICAGO AXLE RECEIVER NAMED

CHICAGO, Sept. 27—Upon the application of attorneys representing at least three creditors, Edwin D. Buell was to-day appointed by Judge George A. Carpenter in the United States District Court here receiver of the Chicago Standard Axle Co. The action follows creditors' meetings held from time to time in the hope that some way could be found to continue operations. The liabilities of the company are given as \$140,000, with the value of the assets, consisting chiefly of machinery, etc., not used. A number of reasons are given for the receivership, among them being cancellation of orders. The appointment of a receiver was made with the consent of the company.

Sopwith Undergoes Voluntary Liquidation

LONDON, Sept. 11 (*Special Correspondence*)—The business of the Sopwith Aviation and Engineering Co., Ltd., at Kingston-on-Thames, is being liquidated voluntarily—as T. O. Sopwith puts it, "while there is time to 'square' everybody." The company's disappearance reflects the trade slump, though for a particular cause it is believed the company could not hope to make good with a 3½ hp. motorcycle which was priced last year at over \$400 and is now over \$750.

The engine embodied aircraft engine practice, that is, cylinders machined from the solid, etc., and while excellent as to design and workmanship, has proved commercially impossible. It is fair to add that the company had many orders for it, despite the price, and that the "slump" is debited with the cause of its withdrawal. About 1500 people are affected.

COURSE IN COOPER UNION

NEW YORK, Sept. 27—Cooper Union has instituted a night school, in motor vehicle engineering, designed for those who are engaged in automotive work during the day. The course includes classroom and laboratory work, and the only charge is a laboratory fee of \$10. Instruction is by Ethelbert Favary. The term begins Oct. 1.

Harper Says Ford in Class by Self

Only One Who Can Lower Prices,
Says N. A. D. A. President
—Looks for Advances

PHILADELPHIA, Sept. 27—Harry B. Harper, president of the National Automobile Dealers Association, commenting on the reductions in cars made by Henry Ford, of Detroit, said that the new prices will affect manufacturers of other cars only temporarily.

"The reduction in the price of Ford cars is not a surprise to me," said Harper. "Henry Ford has made enormous profits on his output of cars and the reduction is merely a reduction of his profits. In other words, he is not losing anything, and is creating a new market for that make of car."

"Other manufacturers have never been in competition with Ford. He is in a class by himself, and always has been. Other manufacturers cannot make their prices lower. I look for an increase in the present prices."

Louis C. Block, president of the Philadelphia Automobile Trade Association, and manager of the Ford Motor Co., Philadelphia, said he is inclined to believe that reductions made by Ford will induce other manufacturers to follow his example.

"But cheaper prices ought to begin at the bottom," said Block. "The cost of the material used in the construction of cars should be lowered to give other dealers a chance to reduce their prices."

Credits for Dealers Arranged by Willys

CHICAGO, Sept. 28—Indicative of the steps being taken by automobile companies to aid their dealers through the present period of credit stringency is the announcement of an arrangement just completed between the Willys-Overland Co. and the Commercial Acceptance Trust, Chicago; the Commercial Credit Co., Baltimore, and the Commercial Credit Co., New Orleans, whereby the three companies will handle the paper of the Willys-Overland Company's retail branches. The arrangement affects Overland dealers and not distributors.

The paper of the retail branches will be accepted with the endorsement of the branches, which is virtually the endorsement of the Willys-Overland Co., and on the same terms with which the three companies would accept other automobile paper.

TIMKEN NOT CANCELLING

DETROIT, Sept. 27—The Timken-Detroit Axle Co. denies widespread reports that it is cancelling steel orders aggregating thousands of tons. Steel deliveries are being deferred because of directions from customers to hold up orders, but there have been no cancellations, the company asserts.

Slight Change Only, Cleveland's View

Ford Cuts Will Have No Immediate Effect on Higher Price Vehicles

CLEVELAND, Sept. 27—Cleveland automobile manufacturers were considerably interested in the price reductions announced by Ford and Franklin, but both dealers and makers asserted readjustments in prices as a result would be slight.

They also declared that the Ford prices have been in a separate class, and that the product can scarcely be grouped with other lines.

Many of the Cleveland plants have been carrying heavy inventories. They also have purchased raw material on a market that was abnormal. When the credit pinch came they stopped increasing their inventories and started to reduce their stock on hand. Manufacturers here state that so far there has been no decrease in the price of raw materials, although there has been a slowing down in the demand for machines and cancellations of orders for parts have resulted.

E. S. Jordan, president of the Jordan Motor Car Co., said: "Ford has a very large production and the industry will be glad to see him make the reduction in the interest of Ford buyers. The reduction will probably have no immediate effect on cars that sell for higher amounts."

George W. Booker, president of F. B. Stearns Co., said that he saw no chance of lower prices on the higher priced cars for several months. "With the exception of leather, nearly every material that goes into an automobile is costing more now than it did three months ago," continued Booker. "This includes alloy steel, fabricated steel, bodies and labor. As a result, the cars that we are building now are costing more than they did a few months ago."

Ford Law Unto Himself

Out at the Winton plant C. W. Mears, in charge of the advertising, argued that Ford is a law unto himself. "If he needs a railroad he buys it," said Mears. "If he wants to cut prices he does, and the fact that he makes a cut at this time should not affect prices of higher priced cars. Statistics show that prices for motor cars have advanced 12 per cent over the average price of 1916, while the prices of other commodities have gone up over 200 per cent. In the face of such a showing by the automobile industry it can readily be shown that there will be nothing done in this industry in the course of the readjustment. With steel the basis of materials in a motor car and with the world demand about five years ahead of supply, it seems out of the question to look for a reduction in car prices at this time."

Other manufacturers who did not care to have their companies mentioned pointed out that price advances have

been much larger than the average in certain instances and that the manufacturer who used the stress of war conditions to run up the price of his car must do more cutting now than the conservative car maker who did not run wild when the war was on.

The sentiment seemed to be that the prices for used cars would be affected by the price cuts, although in many cases the opinion was expressed that the market would quickly adjust itself as it has in all other instances where price reductions have been made.

Used Car Market Hit

J. F. Judd, of the Judd Automobile Co., dealer in used cars, took an optimistic view of the situation and argued that while the Ford cut will undoubtedly disturb the used car market for awhile and cause some price cutting, yet a readjustment will be affected and then things will go along smoothly. He says dealers who stocked up on used Ford cars will bear the brunt of the trouble, but that this depression will not last long, as there are not many used Ford cars on the market.

Truck Demand Grows, Wage Scales Reduced

PHILADELPHIA, Sept. 28—Following a slump which has prevailed in the truck and passenger car market here for the last two months, indications lead to the belief that the demand from now on will increase. Trucks, especially, it is said by dealers here, give promise of being used this winter to a greater extent than ever to help solve the transportation problem. The Chamber of Commerce is especially friendly toward plans to use trucks as auxiliaries to the railroads, George P. Wilson, commissioner of transportation of the Chamber, doing considerable to promulgate motor transportation.

Reports from vehicle manufacturers in the State show that unemployment varies, but that production per man is increasing.

In many cases where reduced working forces are being rehabilitated, replacements are being made at reduced wage scales. According to statistics compiled by the Manufacturers' Club, wages are on the down grade for both skilled and unskilled labor.

BETHLEHEM CREDITORS MEET

NEW YORK, Sept. 30—Members of the Bethlehem Motors Corp. merchandise creditors' committee met here this morning with Sidney S. Meyers, general counsel of the Motor and Accessory Manufacturers' Association, to consider what action will be taken. It was the first formal meeting of the committee. It will hold a joint session this afternoon with the counsel and committee representing the bank creditors. An early announcement is expected of reorganization plans. There is every reason to expect continued operation of the plant at Allentown.

Parts Makers Say Can't Lower Prices

Material or Labor Costs Must Drop, Assert Executives— Lower Trend Expected

DETROIT, Sept. 27—Predictions by Ford and Franklin that they would be able to obtain at lower prices the materials which go into the manufacture of automobile, are not borne out by assertions made by parts manufacturers interviewed by a representative of AUTOMOTIVE INDUSTRIES. Some of them assert that there are car manufacturers who have made large profits and can afford to reduce, but that such is not the case with the parts makers. Here are some of the opinions expressed:

M. A. Moyihan, treasurer, Gemmer Manufacturing Co., steering gear manufacturers: "The parts manufacturer has not had the margin of profit the automobile maker has enjoyed. We don't deal with the public but with critical and experienced buyers. Naturally they know the price of every pound of raw material entering into parts and we must sell them on close margin. Some automobile manufacturers have been making big profits. They can afford to reduce. Parts men buy close year after year and watch market present and future. Unless price of raw material comes down and labor price is reduced or greater efficiency given there is no chance for reduction on parts. There is nothing in prospect indicating such a situation and there consequently can be no reduction in the price of parts manufacturers' products."

L. B. Burnell, treasurer, Holley Carburetor Co.: "Our company and all other parts makers have been operating on only a reasonable margin and reduction in prices now is out of the question. I expect trend downward to go down the line but not to the extent anticipated as a result of Ford and Franklin statements. Our prices to Ford decreased all the time that prices on his products were increased. It is hardly to be presumed we will be willing to bear the brunt."

Operating on Small Profits

Fred Glover, general manager, Timken Detroit Axle Co.: "We have been running on close margin—in fact about the same as last year. We have not increased our prices since March and made small profit this year, precluding the possibility of a decrease now. Under existing conditions it is impossible for parts manufacturers to decrease prices and exist. Ford and Franklin statements naturally will have tendency to make people hesitate, but I see little actual effect on the industry in so far as price reductions are concerned."

C. C. Carlton, secretary of the Motor Wheel Corp. at Lansing, Mich., declared Ford is the optimist of Michigan automobile circles.

Complete Refinancing of Maxwell-Chalmers

Consolidation of Companies Assured Under Plan—Gets \$15,000,000 Working Capital

NEW YORK, Sept. 29—Formal consolidation of the Maxwell Motor Co., Inc., and the Chalmers Motor Corp., is assured a refinancing plan worked out by a committee representing the stockholders, the bank creditors and the merchandise creditors. Under it \$15,000,000 in new capital will be provided. Present stockholders will be given an opportunity to reinforce their equity by subscribing to the stock of the new company, but if they fail to do so it will be underwritten by a syndicate headed by Blair & Co., of this city. Stockholders who do not deposit their securities will forfeit most of the value of their holdings, and it is expected they will take a large part of the offering.

The plan follows closely the forecast made some time ago in AUTOMOTIVE INDUSTRIES.

The new company will have an authorized capital of 1,000,000 shares, of which 200,000 shares are to be Class "A" stock (par \$100) and 800,000 shares Class "B" stock (no par value). It is estimated that there will be immediately issued 153,000 shares of Class "A," and 620,179 shares of Class "B" stock as follows:

| | "A" Shares | "B" Shares |
|-------------------------------------|------------|------------|
| Off. to shareholders (underwritten) | 150,000 | 400,000 |
| Exch. for old stock | | 170,179 |
| For acquis. | 3,000 | 50,000 |

Class "A" stock is to have priority over "B" stock, both as to assets and non-cumulative dividends up to \$8 a share, with a right to participate in the "B" stock in dividends in any year after \$8 has been paid on both classes.

Depositing shareholders will also have the option of purchasing additional stock in the new company on the following basis: For 1 share of existing stock deposited.

| | New Stock Class A | Class B | Cash Payment of 10% of Price |
|------------------|-------------------|---------|------------------------------|
| Maxwell 1st pfd. | .45 | 1.2 | \$4.50 |
| Maxwell 2nd pfd. | .225 | .6 | 2.25 |
| Maxwell com. | .09 | .24 | .90 |
| Chalmers pfd. | .54 | 1.44 | 5.40 |
| Chalmers com. | .09 | .24 | .90 |

The time for subscription for new stock expires Nov. 1, 1920.

The unsecured claims will be paid one-third in cash and the balance in 7 per cent notes of the new company, payable in one, two or three years in equal instalments. Unsecured claims and notes are said to aggregate \$22,914,000.

The existing stock will be exchanged for new class "B" stock at the following rate: For each ten shares of existing stock of

| | | |
|------------------|----|----------------------|
| Maxwell 1st pfd. | 5 | Shares Class B Stock |
| Maxwell 2nd pfd. | 2½ | Shares Class B Stock |
| Maxwell com. | 1 | Share Class B Stock |
| Chalmers pfd. | 6 | Shares Class B Stock |
| Chalmers com. | 1 | Share Class B Stock |

The holders of certificates of deposit issued under the original plan dated Aug. 30, 1919, for first mortgage 6 per cent five-year notes due Oct. 1, 1922, of Chalmers Motor Corp. acquire no rights under the revised plan and upon surrender of their deposit certificates will receive their notes, which remain undisturbed.

The time for making further deposits expires Oct. 15. The Central Union Trust Co., New York, is depository.

Stock heretofore deposited and not withdrawn by Oct. 17, 1920, will be bound by the terms of the new plan.

To Have Complete Control

The affairs of the consolidated companies will be absolutely under the direction of the committee on management headed by Walter P. Chrysler and J. R. Harbeck. They will dictate the policies, and will make whatever changes seem advisable to them in the active management. The various elements involved were brought together finally after many weary weeks of conference upon the distinct understanding that Chrysler and Harbeck would take a permanent interest in the fortunes of Maxwell-Chalmers, although they will not assume the active management.

Harbeck and Chrysler expect that under normal conditions the new company will show profits of \$7,000,000 or \$8,000,000. They are confident many of the difficulties which have existed in the past can be corrected by new policies which will be put into effect at once. Fundamentally this trouble was due to the financing of sales. The companies sold their products for cash and paper. When the credit pinch came the banks were piled up with paper and the dealers were overstocked. Failure to meet the paper transformed it from an asset to a recurring liability, and it was necessary to call for help with debts of \$33,000,000.

When the crux of credit difficulties arrived there were no less than 17,000 cars of all models on hand and unsold. The companies were headed directly for a receivership, under which the stockholders would have had no equity and the creditors would have received less than 50 cents on the dollar.

With the uncertainty which has surrounded the companies' affairs largely dissipated it is expected rapid progress will be made in putting them on their feet.

MOLINE TO BUILD TRUCKS

MOLINE, ILL., Sept. 28—The Moline Plow Co., manufacturing farm implements and tractors for many years, will manufacture a line of commercial vehicles after Oct. 1. Experiment and development work has been going on for some time, and the experimental models have completed exhaustive test runs. The first model to be distributed will be Model 10, having a capacity of 1½ tons. The same engine is used in this model as in the Moline Universal Tractor. The trucks will be distributed through Moline implement and tractor dealers. Many of the parts of the tractor and the truck are interchangeable.

Willys Corporation Sells Curtiss Share

Holdings and Control Passes to C. M. Keys, Curtiss Official—To Make Biplanes

NEW YORK, Sept. 27—The Curtiss Aeroplane & Motor Corp. has been sold by the Willys-Overland to C. M. Keys, vice-president and chairman of the finance committee of the Curtiss company. The sale involves 60,000 shares of the common stock of the Curtiss company, but no announcement has been made as to the price paid. The negotiations were completed nearly a month ago, but announcement of the sale was withheld.

Control of the Curtiss company was taken over by the Willys-Overland Corp. in June, 1917, for a period of approximately three and one-half years. This was done after John N. Willys personally took charge of the airplane plant at the request of the Government during the war.

The Curtiss company announced last June that it had abandoned practically all plans for the manufacture of commercial airplanes, and its \$4,000,000 plant at Buffalo was taken over by the Willys interests for the manufacture of motors and other automobile parts. It is understood, however, that the company expects to resume manufacturing with its Eagle biplanes, upon which experimental work has been virtually completed. One of these planes made an initial flight Sunday over the Curtiss field at Mineola, carrying an aggregate weight of about 3500 lb., including nine passengers. The plane, which is powered with a 400 hp. Liberty motor, has a speed of 105 miles an hour, and carries sufficient fuel for a 10 hour flight.

No radical changes in the policy of the Curtiss company are contemplated. The transfer of control by Willys was actuated by the belief that the relation between the automobile and airplane is somewhat remote at present.

DEVELOPS NEW BEVEL GEAR

LONDON, Sept. 10 (Special Correspondence)—One of the minor causes of the hold-up of output which marked the earlier months of this year's British motor production was a lack of American spiral-bevel gear generators and a corresponding delay in the filling of orders for that form of gear. Gradually the delay was overcome, in one case (the Arrol-Johnston Works, Scotland) by a clever adaptation of a standard miller combined with an oscillating rolling slide. In other cases a return to the plain bevel gear was made pending better facilities of supplying the new tooth form. Now, a British company, Smith & Coventry of Manchester, has patented and brought out what is claimed to be the first spiral-bevel gear generator of British make.

Perlman Objects to Financing Plan

Does Not Want Standard Parts Mortgaged—Offers Alternative Proposal

CLEVELAND, Sept. 27—Frequent conferences are being held by the various committees which are trying to work out a satisfactory settlement of the tangled affairs of the Standard Parts Co., but no suggestion has been brought forward thus far which is acceptable to all the elements involved.

L. H. Perlman of New York, who brought the injunction suits which resulted in the receivership, has balked at the plan proposed by President Eaton, one of the receivers, and his associates. This plan provided for the sale of \$6,000,000 par value 5-year first mortgage 8 per cent gold notes and \$4,000,000 par value prior lien preferred stock. The bankers who now hold \$6,000,000 of the company's notes would purchase the note issue at 93 and accrued interest. The stock would have been offered to stockholders at par on the serial payment plan.

Under this plan a sinking fund would have been provided of not less than \$500,000 a year for the redemption of the notes and of one-half the earnings of the company in excess of \$3,000,000 a year to retire the stock, which would have been issued at the rate of \$500,000 annually.

Perlman took the ground that he never would consent to a mortgage so long as the company is perfectly solvent as he contends it is now. He insisted that such a step would not be fair to the stockholders or the merchandise creditors because their claims then would not be protected. He also objected to payment of a commission of \$420,000 to the bankers.

Proposes Stock Issue Plan

In lieu of the proposal to which he objected, Perlman proposed refinancing the company by issuing \$6,000,000 of new preferred stock and \$4,000,000 in present preferred and common stock now in the treasury. He would have the new preferred a prior lien on the corporation's assets, to bear 8 per cent interest and be redeemable at 110 at the end of 5 years. This stock would be offered at par and would be free from any mortgage clause. He estimates that the \$4,000,000 unissued treasury stock could be sold to stockholders, the preferred at par and the common at \$50 a share. It is his belief that the bankers who hold the greater part of the past due notes of the corporation would take a reasonable part of the new preferred stock. In a statement of his views on the subject, he said:

"As evidence of my faith in the future of the Standard Parts and its profitable continuance as a manufacturing corporation under capable and wise management, I am willing to subscribe, in addition to

my present holdings, to \$50,000 of the common stock of the company, \$50,000 of the present preferred stock and \$50,000 of new preferred stock."

Perlman believes that some of the merchandise creditors might be willing to accept some of the stock mentioned by him as part payment upon the understanding that the remainder of their claims would be paid in cash at a stated time.

The receivers have asked permission to expend \$113,000 for the completion of building operations at the axle plant and there is no opposition to this action.

The Cincinnati creditors have agreed to join with the Cleveland creditors' committee in efforts to effect a satisfactory reorganization of the company's affairs. The creditors have been given a statement showing assets of \$24,490,294 and liabilities of \$9,375,690.

Globe Motors to Ship First Cars This Year

CLEVELAND, Sept. 28—Charles H. Davies, president of Cleveland's newest automobile manufacturing corporation, the Globe Motors Co., says 50 cars will be delivered from his plant to dealers before the first of the new year. He is planning a production of 5000 passenger cars and 1000 $\frac{3}{4}$ -ton trucks next year.

Production already is going ahead in the first unit of the plant in Euclid Avenue, near the eastern corporation line of Cleveland. Eight thousand feet of working space has been provided in this first unit. The contract has been let for a new building containing 40,000 ft., and the contractor is under bond to have the job completed by Dec. 15.

The Globe Motors is putting on the market two models of passenger cars, one a five-passenger, four-cylinder, and the other a four-cylinder roadster. Each car will sell for \$2,000. The price for the $\frac{3}{4}$ -ton truck has not been fixed.

Davies is the founder of the Supreme Motor Corp. at Warren, Ohio, where a four-cylinder engine is made. That engine will be used in all Globe cars.

ACCEPTANCE OPENS BRANCH

KANSAS CITY, Sept. 28—General Motors Acceptance Corp. will open its branch in this city on Oct. 1 under the management of George G. Mead, formerly manager of the service division of the executive office, New York. The Kansas City branch will have as its territory Wyoming, Colorado, Nebraska, Kansas, Oklahoma, western Iowa and western Missouri. General Motors dealers and distributors in this district will make all their time sales through this branch from Oct. 1 on, instead of through the Chicago office as formerly.

S. M. M. T. HAS 1000 MEMBERS

LONDON, Sept. 10 (*Special Correspondence*)—The Society of Motor Manufacturers and Traders, Ltd., has now 1000 membership. In 1914, just before the war, the membership exceeded 600, and in 1919 had risen to over 700.

Experts Press Need for Snow Removal

Highways Must Bear Brunt of Driveaways and Short Hauls in All Seasons

CLEVELAND, Sept. 28—A campaign to keep the main highways in the Middle States free from snow next winter that driveway of cars and short haul motor transportation may be maintained, was started in Cleveland Friday at a meeting which was held in Hotel Statler, under the auspices of the National Automobile Chamber of Commerce. J. L. Harrison, senior highway engineer of the Federal Bureau of Roads, and K. A. Moore, of Detroit, assistant traffic manager of the National Automobile Chamber of Commerce, were in attendance at the gathering which brought together traffic officials from all automobile manufacturing plants in the city.

It was the first of a series of meetings that will be continued in Middle Western States until every highway department and local road official will be prepared to promptly ditch any snow fall that interferes with main motor traffic. Speaking of necessity for the campaign, Moore explained that with the motor truck performing such a necessary service in short haul freight transportation, it must be given the same continuity in service as production generally possesses.

He pointed out that the railroads already are crowded to capacity with freight and that should there be another severe winter in the Middle West and the main highways be not kept open, disastrous results to the producer and consumer would follow. Millions of tons of short haul freight are transported over Ohio highways monthly now, while hundreds of thousands of cars are driven away from factories. The welfare of both producer and consumer demands that there be no interruption of that service, said Moore.

Would Equip Army Trucks

Figures were produced to show that in the Middle West are made 90 per cent of all commercial and passenger cars used in America. Harrison explained that the work of clearing roads of snow in Ohio is entrusted to the State Highway Department and county and township officials. The government, he said, had given the State Highway Department more than 500 left over army trucks, and he urged that these be equipped with snow plows for use next winter. Some of the trucks were so equipped last winter and they gave excellent service. The traffic men unanimously agreed to devote their best efforts toward influencing the Highway Departments to purchase additional snow plows before winter set in.

Harrison explained that his bureau is giving engineering advice on how to be rid of the snow nuisance, and is carrying on extensive propaganda for campaign.

Industry Threatened by Increase in Tax

Treasury Department Considers Recommendation to Congress Doubling Present Rate

WASHINGTON, Sept. 24—It is the intention of the Treasury Department to recommend to the incoming Congress a program of tax revision which embraces a proposal to double the tax rate on the automobile industry. The measures contemplated by the Treasury Department to raise sufficient funds for the operation of the Government means the abolishment of the excess profits tax and a replacement of this revenue by a tax on the undistributed profits of corporations; repeal of sales or consumption taxes on fountain drinks, luxuries, and medicinal articles and other changes which do not directly concern the automotive trade.

The Secretary of the Treasury has not, of course, publicly announced his complete program for raising public revenues. However, it is quite clear to financiers and industrial leaders who have made a close study of the taxation problem, that the Treasury's policy will be substantially in accordance with recommendations of the Tax Advisory Board. This board was created for the express purpose of providing practical and equitable means by which the Government could levy taxes. It is a foregone conclusion that the utterances of Dr. T. S. Adams, chairman, reflect in a large measure the attitude taken by the Tax Advisory Board on a revision of taxation system.

Must Contribute More Heavily

In an interview given AUTOMOTIVE INDUSTRIES, the chairman declared with the utmost frankness that the automobile industry should be obliged to contribute more heavily to the public revenue. Dr. Adams has devoted several months to an exhaustive study into the ways and means necessary to raise the money lost in event the excess profits tax is repealed. And Dr. Adams is not alone in the assumption that Congress will enact legislation abolishing this form of taxation. This official is of the opinion that the equities of taxation would be maintained by doubling the present rate on automobiles, jewelry, candy and sugar. Taking the item of automobiles as an example, Dr. Adams has estimated that an advance from 5 to 10 per cent would bring approximately \$250,000,000 into the Treasury vaults. This form of tax levy is known as a selected sales tax. Dr. Adams holds that it is the best way because it involves no real burden to the manufacturer or the dealer.

"Farmers and wage-earners are likely to protest at the increased cost," said Dr. Adams, "but we may expect business interests to regard it as inadequate because the consumer does not contribute as heavily as heretofore. Consumption taxes, like other taxes, are necessary

evils, but assuming that the income and profits taxes have been pushed to the point of maximum productivity and that their yield is insufficient to pay current expenses and wipe out the floating debt, there is no doubt in my mind that a few consumption taxes would do less harm to the agricultural and wage-earning classes than the inflation and credit disorganization resulting from the constant renewal of outstanding Treasury certificates."

Sales Tax Not Adequate

The chairman believes that the proposal of certain business organizations to substitute a general sales tax for both the excess profits tax and the income tax on the ground that practically all taxes are shifted through the consumer, is not entirely accurate. He contends that the inequalities of the excess profits tax cannot be rectified by a process of shifting and diffusion. Dr. Adams advocates the retention of the income tax as a permanent source of revenue.

It is proposed that the Government levy a tax of two cents per gallon on gasoline. Estimates have been prepared showing that on the present basis of consumption the Government would net \$90,000,000 in taxes from this source alone. It is encouraging to note that the Government has no intention of allowing oil producers to shift the tax. Instead they plan to levy the gasoline tax at the refineries to prevent the diffusion to the ultimate consumer. The Government believes that taxes can be effectively and equitably levied at the point of highest concentration, or in other words at the manufacturing centers.

If this course is pursued, it will lessen the burden on the dealer. The Treasury realizes full well that direct assessment of a tax on the consumer would be decidedly mischievous in effect. It would naturally inspire opposition and result in a marked diminution of consumption.

Must Check Expenditures

The Ways and Means Committee, when it assembles in December, will be told by Treasury officials that by the practice of economy the expenditures of the Government will be less than the ordinary receipts for the year, excluding the public debt. The latest estimates make clear the fact that without reductions in tax levy approximately \$2,500,000,000 of the floating debt will be liquidated by July 1, 1922. However, these figures may be offset or reversed by increased expenditures which cannot be foreseen.

Consumption taxes produce about \$950,000,000 a year or 18 per cent of the total collections from internal taxes. The abolishment of the excess profits tax, calculated on the basis of the present returns, would mean a deficit of five or six hundred million dollars. There is nothing to indicate that Congress in its wisdom would follow in full the recommendations of the Treasury Department inasmuch as they must harken to the taxpayers in Congressional districts. These recommendations, however, will command general consideration.

Industry Maps Out Legislative Action

Conference Committee to Launch Crusade Against Evils—To Pass on 3500 Bills

NEW YORK, Sept. 27—A comprehensive program for supplying the State Legislature with facts and figures relative to the automotive industry has been worked out by the Motor Vehicle Conference Committee, of which David Fenner is chairman, and Harry Meixell, secretary. The various organizations devoted to the welfare of the industry are represented on the committee.

The conference committee proposed an energetic movement for strict laws against speeders, those who use muffler cutouts, and those who operate cars with run-down tires, which injure the roads. The committee expects to handle this year a grist of at least 3500 motor vehicle bills, which undoubtedly will be introduced in 42 State legislatures.

During the present year the committee has been supplying its individual membership with complete and accurate information relative to motor vehicle bills and laws enacted. Next year it not only will follow the course of legislation but will also endeavor to lay before the law-makers, facts and arguments, designed to guide views into channels both sound and equitable. With this end in view, steps now will be taken to create in each State a sub-committee of the Motor Vehicle Conference Committee, which will unite all the motor interests in that State for single and harmonious execution as well as to impress upon the legislatures the policies which the committee believes shall guide such legislation.

These sub-committees will consist of a representative of each of the six associations represented on the conference committee. These organizations are: The American Automobile Association, the Motor and Accessories Manufacturers Association, the National Automobile Chamber of Commerce, National Automobile Dealers Association, Rubber Association of America, and the Trailer Manufacturers Association of America. These State representatives will meet and form a working organization, which will be in constant and immediate touch with the parent committee in New York, both supplying it with information and receiving data relative to motor laws in other States.

The committee already has set forth in its proposed uniform vehicle and proposed uniform anti-theft provision, what it believes are correct provisions for measures dealing with regular size and weight restrictions, curtailment of car-stealing, etc., and is now engaged in the formulation of scientific guides for Federal and State laws dealing with all other subjects of important concern to the motor vehicle. It will be the

(Continued on page 698)

Many Standing Pat but Others Reduce

Jewett Reduces Paige Prices After First Opposing Cuts—Others Get in Line

(Continued from page 689)

That some manufacturers themselves do not know what they are going to do is evidenced by inconsistencies already apparent in statements made by them. For example, H. M. Jewett, president of the Paige-Detroit Motor Car Co., declared emphatically at the close of the manufacturers' conference in Detroit that no price reduction was possible for his company in view of conditions. This was followed to-day by a cut of approximately \$200 on all models of Paige cars. In announcing the reductions, Jewett said:

"There are no economic grounds to justify these reductions in price. The prices of Paige cars always have been based on the cost of first class materials, expert workmanship and a fair profit. Materials from which cars are now being made were purchased months ago. There has been no reduction in costs since then. In fact, basic factors like steel, transportation and coal, have gone up.

"However, to start what seems at this time a worthy movement and to contribute a telling blow to the cost of living, the Paige is willing to make its own sacrifices, and at the new prices we are announcing cheerfully, accept a loss."

While Paige was announcing its drop a conference was on at the Maxwell-Chalmers offices, at the close of which an average reduction of \$140 was reported in the prices of various Maxwell and Chalmers models, including the Maxwell trucks. Walter P. Chrysler, chairman of the management committee, said the two companies were in excellent position to establish new prices by reason of the fact that under the reorganization inventories have been readjusted. "The company has full confidence," he said, "that new material can be secured at prices which will permit these price reductions."

After announcing increases of \$200 on Cleveland and Chandler cars on Monday, the Chandler Motor Co. made reductions of \$200 to-day on the Chandler and \$150 on the Cleveland. This is a net reduction of \$100 on the one line and \$50 on the other.

The Anderson Motor Co. announced increases on all its models, effective Oct. 15, with the statement that it was necessary "in order to maintain and improve the present quality. Our costs per

Buick-Oakland Guaranteed

NEW YORK, Sept. 27—Oakland and Buick dealers have received telegrams guaranteeing reimbursement in case of price reductions before July 1, 1921, on new, unused cars on hand not more than 30 days. The messages add that it is unlikely that Oakland and Buick prices will be decreased before July 1, 1921.

Hudson-Essex Price Cut

DETROIT, Sept. 28—Following are the old and new prices on the Hudson line:

| | Old | New |
|------------------------|---------|---------|
| 4 Passenger | \$2,600 | \$2,400 |
| 7 Passenegr | 2,600 | 2,400 |
| Coupe | 3,575 | 3,275 |
| Cabriolet | 3,050 | 3,000 |
| Touring limousine | 3,925 | 3,625 |
| Limousine | 4,275 | 4,000 |

The new and old Essex prices are:

| | Old | New |
|-------------------|---------|---------|
| 2 Passenger | \$1,795 | \$1,595 |
| 5 Passenger | 1,795 | 1,595 |
| Cabriolet | 2,900 | 2,100 |
| Sedan | 2,650 | 2,450 |

Willys Products Drop

NEW YORK, Sept. 28—Here are the new Overland prices as compared with the old list:

| | Old | New |
|-------------------|---------|-------|
| 2 Passenger | \$1,035 | \$895 |
| 5 Passenger | 1,035 | 895 |
| Coupe | 1,525 | 1,425 |
| Sedan | 1,675 | 1,475 |

Old and new prices on Willys-Knight cars follow:

| | Old | New |
|-------------------|---------|---------|
| 2 Passenger | \$2,300 | \$2,195 |
| 5 Passenger | 2,300 | 2,195 |
| Coupe | 2,950 | 2,845 |
| Sedan | 3,050 | 2,945 |

Peerless Continues Price

CLEVELAND, Sept. 29—R. O. Schmunk, sales manager for Peerless Motor Co., said to-day his company is standing pat on present prices and that reductions cannot be made. He denied that the price had been raised and said such action was not contemplated. Letters have been sent to sales agents advising them that present prices will prevail.

Maxwell-Chalmers Reduced

DETROIT, Sept. 28—Walter P. Chrysler announces that Chalmers open models which sold at \$1,945 have been reduced to \$1,795. There is a lesser

car have increased considerably during the past 60 days on account of decreased production and increased freight rates."

The Buick Motor Co. sent this telegram to its entire sales organization:

"We guarantee you against any factory reduction in list prices on all 1921 models on hand or in transit up to July 1, 1921."

PRICE CUTS SWAY INDUSTRY

reduction on the enclosed types, the prices of which are not given. The Maxwell reductions follow: Touring car and roadster from \$1,155 to \$995; sedan, \$1,895 to \$1,695; coupe, \$1,795 to \$1,595. The average reduction on trucks is \$140.

Chandler-Cleveland Cut

CLEVELAND, Sept. 29—A \$200 reduction was announced to-day on all models by the Chandler Motor Co. and of \$150 on those of the Cleveland Automobile Co., which it helped to organize. F. C. Chandler said the reduction became effective at once. Chandler touring cars are cut from \$2,095 to \$1,895. The company announced an increase of \$100 on all Chandler and Cleveland models Monday.

Franklin Gains 333 Per Cent

SYRACUSE, Sept. 30—Daily average sales of Franklin automobiles throughout the country have increased 333 per cent since the price reduction announcement last Thursday, compared with sales records for the first 22 days of September.

H. H. Franklin, president of the company, says some makers of parts and materials have already offered to reduce prices.

The Franklin plant, now operating on a five-day week schedule, will immediately return to full schedule of 5½ days. Production now of sixteen cars a day will be increased.

Bour-Davis Prices Cut

SHREVEPORT, LA., Sept. 29—Louisiana Motor Car Co. has reduced prices on the Bour-Davis models as follows: 7-passenger touring, \$2,875 to \$2,585; 5-passenger, \$2,825 to \$2,535; 3-passenger roadster, \$2,875 to \$2,585; L. M. C. 2½-ton truck, \$2,950 to \$2,540. The new prices are effective at once.

Paige Drops Dividend Rate

BOSTON, Sept. 29—Paige-Detroit Motor Car Co. has reduced quarterly dividends on common stock from 3 to 1 per cent. Common stock is \$10 par. This is the first important motor company to reduce dividends.

Grant Motors recently omitted its common declaration.

WILLYS LAYS OFF 4500 MEN

TOLEDO, Sept. 30—Forty-five hundred men were laid off at the plant of the Willys-Overland company here to-day, reducing the force now at work to 2000. In the early months of the year when the plant was on full production basis the employee force numbered 14,000.

SUPREME MOTORS BUYS LAND

CLEVELAND, Sept. 21—Announcements of several important expansions in the automobile industry here were announced last week.

INDUSTRIAL NOTES

Nowlan Machine Works, Janesville, Wis., formerly the Badger State Machine Co., has been acquired by interests at Beloit, Wis., to which city the plant and equipment are being transferred. The new owners are George B. Slater and George E. Marsden, of the Slater & Marsden Foundry Co. and Wisconsin Farm Implement Co., and Harry E. Whittemore, of the Hendley & Whittemore Co., all of Beloit.

Stamp Machine Co., Milwaukee, has contracted with the Plymouth Motor Co. of Plymouth, Wis., for quantity output of the Stamp mixer-loader, a combination machine designed for concrete work in highway and general building construction. It is equipped with a 4-cylinder, heavy duty Waukesha motor.

Fred Rosche Foundry Co., Waupaca, Wis., manufacturer of gray iron castings for the gas engine and automotive industries, has been taken over by Ralph Gertsch of Oshkosh, Wis., and Louis Hannemann of Weyauwega, Wis., who will remodel the plant and place it in operation on an enlarged scale about Nov. 1.

American Spark Plug Co., Milwaukee, which is moving its plant and equipment to Sun Prairie, Wis., has changed its corporate style to American Spark Plug & Porcelain Specialty Co. with the intention of enlarging its scope of production. Ben J. Chose is secretary.

Acme Body Works, established a year ago at Appleton, Wis., has started work on the fourth factory addition made since that time. This will increase the area to about 12,000 sq. ft. A heating plant will be installed and the painting department improved.

Twin City Auto Body Works, Neenah, Wis., has been formed with a capital stock of \$15,000. The incorporators are Fred C. Stecker, Frank Foth and John Blenker. The principal product will be bodies and cabs for motor trucks.

Southern Motor Mfg. Assn., Ltd., has awarded a contract for a malleable iron foundry to be erected on its site at Houston, Tex., to cost \$50,000 to \$60,000. It will have a capacity of 17 tons of malleable and gray iron a day.

White Motor Co. has bought two lake steamers to facilitate deliveries. The company reports its output sold to Jan. 1. Prices are approximately 10 per cent higher than pre-war and will be little affected by slashing.

Candler Radiator Co., Detroit, now is located in its new factory on Shoemaker road. The plant is thoroughly equipped with modern machinery and appliances, which will triple former capacity.

Gray-Dort Motors, Ltd., is doing all its own body building, top building and machine work, and in about three months will own and occupy a factory where it will make all its own sheet metal.

Lancaster Steel Products Co. has opened a New York office in the National Association Building, 25 West Forty-third Street, in charge of L. E. Vesey, district sales manager.

Poll-Eells Airplane & Motor Corp., Buffalo, will establish a plant for the manufacture of all-steel commercial airplanes. The company is headed by H. R. Pollay and Fred Eells.

Western Vulcanizer Mfg. Co., Chicago, manufacturer of the "Dri-Kure-Retreder,"

has added 35,000 ft. of floor space due to greater domestic demand of its products and greatly increased export trade.

Automotive Machine & Tool Co., Janesville, Wis., organized by F. L. Clark and J. R. Colquhoun, has completed the equipment of the shop building and is in production on tools, dies, special machinery, etc.

Harvey Spring & Forging Co., Racine, Wis., has opened a Chicago factory branch at 3020 South Michigan Boulevard, in charge of Edward Murphy.

Continental Motors Corp. is installing engine and boiler equipment in its new power plant at Muskegon, Mich. The plant is expected to be in full operation by Jan. 1.

Norton Co., Worcester, Mass., has opened branch offices in Pittsburgh and Indianapolis. Paul R. Hawkins will be in charge of the former and Walter F. Rogers of the latter.

Jarvis Engineering Co., Lansing, Mich., is building an addition to its plant, 40 by 165 feet, of steel and glass construction.

Kearns-Dughie Motors Co., maker of Kearns motor trucks, has moved its plant and offices from Beavertown to Danville, Pa.

Service Truck Co. has purchased a site at London, Ont., on which building operations are expected to be started in a short time.

Goodrich-Lenhart Mfg. Co., Hamburg, Pa., has consolidated with the Motor Parts Co. of Philadelphia.

R. H. Beaumont Co., Philadelphia, has opened a Pittsburgh office at 230 Fifth Avenue, with Thomas Widdop in charge.

Climax Rubber Co., Columbus, is seeking a rubber plant costing approximately \$500,000.

SPACKE RECEIVERS NAMED

INDIANAPOLIS, Sept. 29—Receivers were appointed yesterday for the Spacke Machine & Toole Co., manufacturers of a two-cylinder, air cooled car selling at \$295. The application was filed in Superior Court by the company itself, which admitted that it was unable to meet its obligations as they come due and sought to protect the interests of all creditors. The receivers named were Charles A. Roember and Robert Fenstel.

The company was incorporated in Indiana in 1917 with a capital of \$1,250,000 common and \$2,500,000 preferred stock. Only \$500,000 of each class has been issued, however. All the common is owned by the Spacke Machine & Tool Co. of Delaware. The company manufactures motors and tractor parts in addition to automobiles. Two of its three plants in Indianapolis have been devoted to the production of the Brook car.

G. M. C. TRUCK OPENS SHOPS

PONTIAC, Sept. 27—The first battery of machines in the new shops of the General Motors Truck Co. swung into action Wednesday, and it is expected that the shop will be equipped fully and running on 100 per cent basis by Dec. 1. The building, which contains 170,000 sq. ft. of floor space, was erected at a cost of approximately \$1,000,000. New machinery costing \$600,000 and old machinery moved from the former shop makes the equipment in the new plant reach a total value of \$1,500,000. Two 60,000 gal. oil storage tanks are being constructed for storing crude oil.

METAL MARKETS

UNDERNEATH the surface, which consists largely of memories of the days when the automotive industries were willing to pay any price for whatever steel and iron they needed, and of chagrin that these days are no more, a new market is being born. With the end of orders on their books in sight, although in many instances many months off, steel makers are beginning to sound automotive consumers in a quiet way as to their ideas of prices for 1921 business and the latter are here and there, at least, responding with what might be called informal bids, although not sufficiently definite as to tonnages and delivery periods to form a tangible basis for quotation as bid prices. The situation in the pig iron market furnishes the best index to the situation. With the market for basic continuing to be quoted nominally at \$48.50, valley, consumers have been throwing out broad hints here and there that they might not be averse to committing themselves as buyers at, say \$40 @ \$45. Far from scoffing at the proposed cut of \$3.50 @ \$8, sales agents and blast furnace interests appeared to be rather gratified. Following the present period of readjustment in the steel market, values are expected to be representative of a rational understanding between producers and consumers, eliminating the last vestige of the mad period of last spring when not sellers but buyers, seeking to elbow one another out of the market, ran prices up to absurdly high levels. Copper and lead have declined further in their return journey to normality.

Pig Iron—Automotive foundries have asked Cleveland pig iron interests to resume shipments of foundry pig which they had requested a month ago to be suspended. Reinstatement of these orders, if one may call it such, amounts to in excess of 5,000 tons so far. A blast furnace in Ohio, specializing in malleable pig, has cut down its accumulation to about a quarter of what it was several weeks ago and made sales at \$47.50 for prompt and at \$46 @ \$47 for first half 1921 shipment.

Steel—The outstanding feature of the market is that one of the United States Steel Corporation's subsidiaries recently advanced its base price for cold-rolled strip steel from 5.65c., Pittsburgh base, to 6.25c., Pittsburgh base, an increase of \$12 a ton. The new base price, however, is still \$45 a ton below the nominal quotation of the independents. It must be and is interpreted as a desire on the part of the leading interest to put backbone into the market at a time when the smaller mills, being near the end of their orders, might feel tempted to make too radical a downward revision in their prices.

Aluminum—Offer of foreign virgin ingots at below 30c. have not served to quicken the interest of buyers. The fact that the sole American producer of virgin metal is pushing extension of its Tennessee rolling mill in every possible way, would appear to prove confidence in the growing consumption of sheets by the automotive industries.

Copper—With hopes of a quickening in the foreign demand fading away, producers of electrolytic lowered their price to 18½c., while speculative holders did business at around 17½c.

Tin—The market is really not a tin market but one in Sterling exchange. Domestic producers of 99 per cent tin, compelled to sell at the equivalent of the foreign price, are not in a very chipper frame of mind.

Lead—Following a further cut of \$10 a ton by the chief interest, the open market receded to 7½c. which is on a parity with the year's opening level. In October 1919 lead sold at 6¼ @ 6½c.

Automotive Financial Notes

Kelly-Springfield Tire Co.—Company is preparing to issue 82,000 shares of additional common stock. It will be offered to stockholders of record Oct. 15 at \$50 a share. Half of the purchase price will be payable Nov. 10 and the balance Dec. 10. The present stockholders will have the right to subscribe to the extent of 35% of their holdings. The issue has been underwritten by New York bankers. News that the stock would be issued caused a break of 6½ points in the present stock on the stock market.

Aage E. Winckler, Milwaukee, a widely known mechanical engineer, has organized the Winckler Engineering Co. of Milwaukee, with a capital stock of \$250,000, to engage in business as consulting and contracting engineers in the automotive and general mechanical engineering line. William Reckmeyer and Orrin R. Hughes are associated with Winckler in the enterprise.

General Motors Corp.—Directors have declared the regular quarterly dividends on all classes of stock, as follows: \$1.50 a share on the preferred, \$1.50 a share on the 6% debentures, \$1.75 a share on the 7% debentures and 25 cents in cash and 1/40 of a share in common on the outstanding common capitalization. The dividends are payable Nov. 1 to holders of record Oct. 5.

W. E. Seymour Mfg. Corp., Milwaukee, has been organized with a capitalization of \$200,000 to engage in the production of automotive materials, parts and accessories. The prime mover in the enterprise is W. E. Seymour, who retired recently as vice-president and general manager of the A. O. Smith Corp., Milwaukee.

Sterling Tire Corp. will pay its regular quarterly dividend of 1½ per cent on the outstanding 7 per cent preferred stock on Oct. 20. A regular quarterly dividend of 2 per cent will also be paid on that date on outstanding series B preferred stock, as will a 1 per cent dividend on common stock.

Steel Products Mfg. Co. has been organized at Racine, Wis., and incorporated with a capital stock of \$80,000 to manufacture metal products of all kinds, principally parts and materials for the automotive industries. The incorporators are William H. Cahill, Lewis J. Quinn and A. L. Strike.

Wohlrab Gear Co., Racine, Wis., manufacturer of gears, pinions, steering gears and other automotive parts and equipment, has enlarged its capitalization from \$75,000 to \$100,000 to accommodate extensions of its plant and equipment and the resultant enlargement of production.

Tower Motor Truck Co. has increased its capital stock from \$50,000 to \$2,500,000 to provide for expansions and for the manufacture of 1400 trucks in the coming year. R. J. Tower, H. D. Baker, J. C. Smith and F. G. Rice have been elected directors.

Marlin-Rockwell Corp. in a balance sheet as of Dec. 31, 1919, shows total assets and liabilities of \$12,712,794, and profit and loss surplus of \$10,349,102, subject to provision for Federal taxes.

Racine Accessories Mfg. Co., Racine, Wis., has increased its capital stock from \$30,000 to \$60,000 to finance increased production and business.

McGraw Tire & Rubber Co. will pay a quarterly dividend of 1½ per cent on outstanding preferred stock, Oct. 1.

Times Square Auto Supply Co., Inc., will pay a regular quarterly dividend of 6½% c. a share on Oct. 27.

McKone Tire & Rubber Co. has been incorporated at Canton, Ohio, for \$500,000.

Virginia Rubber Co. has increased its capital stock from \$1,200,000 to \$2,500,000.

Timken Reserves Fund to Maintain Program

DETROIT, Sept. 28—Explaining the 2 per cent cut in the Timken Detroit Axle Co.'s dividend rate, President A. R. Demory declared the decision was reached despite the fact that total shipments for the first half of the year were \$25,914,128.84, with net earnings sufficient to allow a continuation of the regular 4 per cent dividend rate. Shipment for the period showed an increase of 79 per cent over the same period in 1919.

This greatly increased output, according to Demory, makes necessary factory expansion and increased inventories sufficient to keep up with demand. Demory's statement says, however, the slump in the demand for motor vehicles will cause the production for the last six months of the year to show a decrease.

The company's balance sheet as of June 30 shows surplus of \$11,459,444.08, which includes \$1,283,864.36 added during the first six months of 1920 after payment of \$655,833.33 in dividends for that period. The net earnings for the first six months were \$1,936,697.69 after providing for taxes. Capital stock includes \$5,000,000 of preferred and \$2,984,900 of common outstanding.

Current assets of \$18,043,895.78 include \$12,680,765.93 in merchandise, \$3,614,429.80 customers' accounts, and \$1,731,787.82 in cash and liberty bonds. Current liabilities of \$3,825,993.93 include \$2,400,000 payable to banks and \$1,007,749.20 accounts payable.

Industry Maps Out Legislative Action

(Continued from page 695)

function of the various State sub-committees to have the motor vehicle interests of their States agree to accept and support these guides or policies, and then unite to educate the public and the law makers to their acceptance.

Great obstacles to procedure of this sort in the past have been that the motor vehicle interests of a State have not known exactly what they wanted, or rather what they were entitled to, in the way of legislation, or else have been too wide apart or conflicting in their desires. This has prevented united action at critical moments and enabled laws to find their way on to the statute books which never did, and do not now, belong there. The conference committee

in its first year's experience giving close and impartial study to all the problems presented for solution has concluded that there is little or no reason why any of its six component organizations, or any of the individual members of these organizations, should ever line up against each other on any issue big or little.

Bank Credits

Written exclusively for AUTOMOTIVE INDUSTRIES by the Guaranty Trust Co., second largest bank in America.

NEW YORK, Sept. 30—The decline of 313,430 tons in the United States Steel Corp.'s unfilled tonnage in August, following 14 consecutive months of increases averaging nearly 500,000 tons, reflects in some degree the slackening of activity in several industries.

Exports in August were valued at \$584,000,000, representing a decline of \$67,000,000 from the exports in July of this year, and \$62,000,000 less than the exports in August, 1919. This was the smallest monthly total since December, 1918, with the exception of that for July, 1919. Exports for the 8 months ended with August were \$5,483,000,000, or \$211,000,000 more than exports in the corresponding months of 1919. Imports in August were valued at \$519,000,000, a decrease of \$18,000,000 from the amount in July, but \$212,000,000 more than imports in August, 1919. For the first 8 months of this year imports were valued at \$1,738,000,000 more than in the corresponding months of 1919.

The number and extent of the reductions in commodity prices in the last week clearly show that a significant readjustment of prices is under way. A general recession of prices should result in further declines in money rates.

The call money market was characterized last week by a plentiful supply of money, with practically a stable rate of 7 per cent. Time money remained at 8 per cent for loans on mixed collateral and 8½ per cent on all-industrial.

The balance of shipments from the interior increased the excess reserves over legal requirements of the New York Clearing House banks by \$4,205,850. Total deposits increased \$82,784,000. Loans and discounts increased \$169,588,000. This statement would seem to reflect increasing activities in the stock market.

The reserve position of the New York Federal Reserve Bank on Friday was the best that it has been this year. The gain appears to have resulted from currency movements from other districts and from a reduction in Treasury borrowings. Total reserves increased \$90,314,450.78.

The statement of the Federal Reserve Banks as a whole, on the other hand, shows a less favorable technical position than for the week previous. While total reserves increased \$18,449,000, net deposits increased \$80,177,000, and bills discounted, secured by Government war obligations, increased \$17,830,000. Total bills held increased \$181,280,000.

Men of the Industry

H. L. Beckwith, for the last eight years connected with General Motors Truck Co. at Pontiac and for years prior to that in the service and sales end of the industry, has been made general manager of the King Trailer, Ann Arbor, Mich. **E. A. Soper**, also formerly with General Motors, has joined King Trailer to handle the accounting end of the company.

E. P. Chalfant, president and general manager of the Automotive Products Corp., sails on Oct. 6 to spend approximately six months investigating automotive conditions in South America. His study will begin with Brazil and will extend through Uruguay, Argentina, Chile and the West Coast.

George Perks, chief engineer of the B. F. Goodrich Co., has resigned. It is reported that his resignation will be followed by a shake-up in the managing officials of the company. A general retrenchment program is being put into effect.

Max Freidman of Freidman Bros. of Shanghai, China, is in Detroit looking for lines for distribution in China. Freidman and his brother formerly managed a distributing firm in England handling well known American cars.

J. D. Beckett, until recently president of the Ox Welding Co. of Grand Rapids, has opened a welding plant at Lansing. The new plant is equipped with heavy caliber machinery sufficient to handle big castings and boiler jobs.

A. A. Loeffler has recently been appointed by the Doehler Die-Casting Co. as its Detroit representative, succeeding F. C. Seger, who will now represent the company on the Pacific Coast, with headquarters in San Francisco.

Samuel Shannon has been engaged by the Kol-Ben Wheel Co. to take charge of inspections at its factory. He was formerly with the Wire Wheel Corp. of America and the Hayes Wire Wheel Co.

W. E. Hutchinson, purchasing manager for the Southern Motor Mfg. Assn., builders of Ranger cars, trucks and trailers at Houston, Tex., has opened an office in the Book Building, Detroit.

E. J. Miles, former chief engineer of the Chalmers Motor Co., has joined the engineering staff of the Studebaker Corp. as consulting engineer. He was formerly with E. M. F. and Maxwell.

C. W. Hadden, export manager of the Minneapolis Steel & Machinery Co., has recently returned from an extensive investigation of the tractor field in South American countries.

Ernest H. Brandt has been appointed Western sales manager of the Oldfield Tire Co., Cleveland, and will make his headquarters in Chicago.

J. P. Derum, who has been General Motors publicity agent in the export department in New York, has returned to Detroit to remain permanently.

L. M. Van Riper has been appointed Western sales manager of the Ajax Rubber Co., Inc., and will make his headquarters in Chicago.

A. A. Franck, comptroller for the Southern Motor Mfg. Assn., Ltd., has been promoted to assistant treasurer of the association.

L. W. Cash, purchasing agent of the DeLance Motor Truck Co., has resigned, effective Oct. 1.

OFFICIALS JOIN CORLISS

DETROIT, Sept. 28—N. A. Hawkins, former general sales manager for Ford Motor Co. and one of the most widely known men in the industry, and A. L. McMeams, formerly secretary of Dodge Bros., have acquired a large interest in the Michigan Lubricator Co., an old established Detroit concern. Hawkins becomes a member of and chairman of the board of directors. McMeams becomes president, director and general manager. The Lubricator Co. has been under the financial control for many years of J. A. Corliss, and was under the active management of his son, C. D. Corliss, until the latter's death in March. The elder Corliss sought the co-operation of Hawkins and McMeams, and they purchased the interest held by John Coyn and E. C. Nagel. The capital stock of the company has been increased, to equalize the property and assets of the company, to \$1,000,000.

STRATTON GOES WITH GRANT

DETROIT, Sept. 24—F. S. Stratton, sales manager of Packard Motor Car Co., left the service of that company Saturday to join George Hubbs who recently took charge as general manager of Grant Motors in Cleveland. Stratton had been with the Packard organization about four years and is one of the best known men in the sales end of the industry.

C. F. Green, who has been connected with Packard sales department for one and one-half years, is in charge of the department for the time being as acting sales manager.

DONOVAN WINS SCHOLARSHIP

ALMA, MICH., Sept. 27—The \$1,000 university scholarship, offered by the Republic Truck Sales Corp., for a Good Roads Essay was won by John M. Donovan, Jr., of Turner Falls, Mass. The competition was conducted in connection with the National Ship by Truck-Good Roads Week, and over 200,000 essays were received. Donovan graduated from the Turner Falls High School last June. The award has just been officially announced by T. T. Claxton, Commissioner of Education of the Department of the Interior.

TO START MISSISSIPPI SERVICE

MEMPHIS, TENN., Sept. 27—Daily aerial passenger service between Memphis and New Orleans will be started next week by the Wood Aerial Transportation Co., a new company in Memphis. B. C. Wood is general manager. Two planes, carrying six passenger each, much the same as the hydroplane used by the navy, will be placed in service. Besides carrying six passengers each will carry 1000 lb. of freight. They will

specialize in passenger traffic and are now negotiating for express and mail contracts. The planes will leave Memphis and New Orleans at the same time each morning and return next day.

The course of flight will follow the Mississippi River. The planes are being built at Miami, Fla. Wood intends to fly from that city to Memphis on Sunday. The other machines will arrive on Tuesday.

L. L. Wilburn Named Briscoe Superintendent

JACKSON, MICH., Sept. 28—L. L. Wilburn, a veteran in the automobile industry, has been made general superintendent in charge of production by the Briscoe Motor Corp. The appointment of Wilburn is another step in President Wardwell's determination to build an organization that will insure Briscoe production to keep pace with demand.

Wilburn began his career in the industry in 1903 with the Haynes Automobile Co. as foreman. He spent four years as plant foreman, chief inspector and assistant general superintendent at the Maxwell plant, and from there went to the Remy Electric Co. as efficiency engineer. Later he returned to Haynes and from that company joined Briscoe in 1919.

Another move by Wardwell to increase efficiency at the plant is the appointment of A. H. Hanneman, formerly in charge of closed body construction for Oakland Motor Car Co., and other General Motors units, as general superintendent of the Bohnet Body Co. at Lansing, Mich. The Bohnet company is a subsidiary of Briscoe.

ALL-AMERICAN IN DIFFICULTY

CHICAGO, Sept. 28—A meeting of creditors of the All-American Truck Co. will be held Oct. 4 at which it is hoped a solution of the corporation's financial difficulties can be worked out. A petition in bankruptcy was filed against the company but arrangements have been made with the petitioners to defer action until after the meeting. A creditors committee has been formed which has recommended that all claims of \$200 and less be paid in cash and that notes be given the other creditors. The plan proposes payment of 25 per cent of the claims in six months and the remainder within a year. The debts of the company aggregate \$400,000. It has current assets of \$600,000 and fixed assets of about the same amount.

WILLYS BUYS WRIGHT BEARING

PHILADELPHIA, Sept. 30—The Wright Roller Bearing Co. has been added to the long list of corporations controlled by the John N. Willys interests. Walter P. Chrysler, executive director for Willys, has been elected vice-president of the Wright company and there are intimations that a large part of the roller bearings for the various Willys plants will be supplied by the Wright company.

Calendar

SHOWS

- Oct. 4-9—Little Rock, Ark., Enclosed Car Show, Little Rock Automobile Dealers' Ass'n.
- Oct. 5-9—Minneapolis, Enclosed Car Show, Minneapolis Automobile Trade Ass'n.
- Oct. 6-16—New York, Electrical Show, Grand Central Palace, George F. Parker, Manager.
- Nov. 14-21—New York, Automobile Salon, Commodore Hotel Ballroom.
- Nov. 15-20—Chicago, Automotive Equipment Show, Coliseum, Automotive Equipment Association.
- Dec. 10-18—New York, Motor Boat Show, Grand Central Palace.
- Jan. 8-15—New York, National Passenger Car Show,

- Grand Central Palace, Auspices of N.A.C.C.
- Jan. 14-21—Milwaukee, Annual Automobile Show, Milwaukee Automobile Dealers' Ass'n.
- Jan. 29-Feb. 4—Chicago, National Passenger Car Show, Coliseum, Auspices of N.A.C.C.
- Feb. 5-12—Minneapolis, Annual Automobile Show, Minneapolis Automobile Trade Ass'n.
- Feb. 6-12—Columbus, National Tractor Show, Columbus Tractor & Implement Club, Ohio State Fair Grounds.
- Feb. 12-19—Kansas City, Annual Automobile Show, Kansas City Motor Car Dealers' Ass'n.

FOREIGN SHOWS

- October—London, Commercial Vehicle Show, Olympia.
- Nov. 4-13—London, International Motor Exhibition, Society Motor Mfr's and Traders, Ltd., Olympia and White City.
- Nov. 6-13—Christchurch, N. Z., Olympia Motors Exhibition.
- Nov. 29-Dec. 4—London, Cycle and Motorcycle Show, Cycle and Motorcycle Mfr's and Traders Union, Ltd., Olympia.
- Jan. 7—Sydney, Australian Motor Show.
- Jan. 22-29—Colombo, Ceylon Motor Show.

CONTESTS

- Oct. 1-2—Trenton, N. J. Dirt track.
- Oct. 8-9—Danbury, Conn. Dirt track.

CONVENTIONS

- October — Cleveland, Service Managers' Convention, National Automobile Chamber of Commerce.
- Oct. 11-13—Chicago, National Association of Purchasing Agents' Annual Convention.
- Oct. 20-22—Atlantic City, Twenty-seventh Annual Convention National Implement and Vehicle Association, Hotel Traymore.
- Dec. 7-10—New York, Annual meeting American Society of Mechanical Engineers, Engineering Societies Building.
- Dec. 8-9—Cincinnati, Annual Convention, Ohio Automobile Jobbers' Association.
- Jan. 11-13—S. A. E. Annual Meeting, New York City.

General Motors Gives Details of Sheridan

DETROIT, Sept. 27—The specifications of the Sheridan Four, the new model of the General Motors Co., have just been given out. It is equipped with an overhead valve type of engine of 3-11/16 in. bore by 5 1/4 in. stroke (224 cu. in. piston displacement). The overhead valve mechanism is enclosed in a removable cover. This engine, as well as the three speed and reverse transmission, is made by the Northway Motor & Mfg. Co. The clutch is a Hoosier plate type, as recently described in AUTOMOTIVE INDUSTRIES. A Zenith carburetor is fitted, and the electric system is of the Autolite two unit type, while ignition is by the Remy system.

The rear axle is a new design, manufactured by another auxiliary of the General Motors Co. The bevel gear and pinion are made of nickel steel. A torque tube surrounds the propeller shaft and takes care of all driving thrust and torque reaction. This torque tube is ball ended at its forward end, the ball being surrounded by a spherical housing, which is bolted to the rear of the transmission housing. One of the features of construction is the frame, which is provided with a tubular cross member at the extreme rear, to which are fitted the rear spring rear hangers. The wheelbase is 116 in. The tire equipment consists of 33 x 4 in. tires all around, non-skid in the rear and plain tread in front. The price for this car will be in the neighborhood of \$1800, it is said.

In addition to the 4-cylinder model there will also be an 8-cylinder Sheridan. This will be equipped with an 8-cylinder Northway engine of 3 1/2 in. bore by 4 1/2 in. stroke. It will have a 132 in. wheelbase, and will sell in the neighborhood of \$3,500.

SHOW TRACTORS IN BRAZIL

WASHINGTON, Sept. 28—Eight American makes of tractors and five from other countries have been entered in the competitive tractor exhibition to

be held near Rio de Janeiro, Brazil, Sept. 30. This information was obtained in a cablegram from Assistant Trade Commissioner Connell, of Rio de Janeiro, to the Bureau of Foreign and Domestic Commerce. The demonstration is being held under the direction of the Brazilian Department of Agriculture, which has greatly interested itself in recent months in the subject of power farming.

Baltimore New Center for Goodrich Exports

BALTIMORE, Sept. 27—The B. F. Goodrich Rubber Co., Akron, will make this city the exporting point for all its foreign trade, approximately \$20,000,000 a year, following negotiations conducted through the industrial bureau of the Board of Trade. Property has been leased for ten years on West Pratt Street which will be the site of the rubber goods exporting warehouse.

According to C. A. Tanner, Baltimore manager for the Goodrich company, conditions here have been found more favorable than in New York for economical and expeditious handling of merchandise. The company, he said, has had many shipments delayed in New York because of port congestion.

TO HOLD ROAD TYPE TESTS

NEW YORK, Sept. 28—To find out the type of road surface which will inflict the least amount of wear on automobile tires and thereby reduce the present \$1,000,000,000 annual tire bill is to be the object of exhaustive tests which are contemplated by the Asphalt Association in co-operation with other interests. Eight million automobiles and trucks with their 32,000,000 tires need only call for an average annual outlay of \$125 to make the total cost for tires \$1,000,000,000. This is far in excess of the annual expenditure for construction and maintenance of highways, and if a type of surface is designed to effect a reduction of only 10 per cent in tire costs it will release a sum which capitalized at 5 per cent is \$2,000,000,000.

Buick Production Starts in St. Louis

ST. LOUIS, Sept. 27—The first car produced here in the new assembly plant of the Buick division of the General Motors Co. was made the occasion of a celebration last Tuesday, when the car was christened by Miss Edna Kiel, daughter of Mayor Henry W. Kiel. A bottle containing water was used.

J. Lionberger Davis, representing the St. Louis Chamber of Commerce, read a message from W. C. Durant, president of the General Motors Co., which said in part as follows:

"Our faith in St. Louis as an ever-growing automobile production center is evident from the size of our investment there. Because of its distribution and accumulation of raw materials and coal, St. Louis is, in the inception of the Buick plant, merely starting its growth in this respect. There are 43,253,913 people within an average haul of 422 miles from St. Louis. This means ready markets."

F. W. A. Vesper, president of the Vesper-Buick Automobile Co., distributors in St. Louis for the Buick cars, and Mayor Kiel also spoke.

It was announced that the new plant will be operated at the rate of 25 cars a day for the first two weeks, when the output will be increased to 50. This output eventually will be increased.

General Motors owns a 105-acre tract at Union Boulevard and Natural Bridge Road, on which is located the Buick and Chevrolet assembling plants, the Chevrolet also having been recently completed, as well as a body wood-working plant. The whole represents an investment of \$9,000,000.

TO CLOSE SPACE LIST

NEW YORK, Sept. 27—Applications for space at the New York and Chicago shows must be received by the N. A. C. C. before noon Oct. 2, in order to be considered in the first allotment. A 25 per cent deposit must accompany the application.